Service Provision Yearly Report (April 2021 - March 2022)

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1 A WORD FROM THE ESSP CEO

With the pandemic almost behind us, ESSP is very pleased to maintain the first class EGNOS services provided for Safety of Life, Open Service and EDAS users. ESSP is facing new challenges presented in this letter and up to now the Performance and Quality of the services are there.

Namely, for aviation EGNOS service is provided in 34 countries, 430 airports/helipads for a total of 821 EGNOS-based operations. The period up to 2030 is a pivotal period for the European Union in the field of air navigation: by 2024, regulation will require 100% of IFR runway-ends in Europe to offer SBAS landing and by 2030 all CAT I landings supported by EGNOS only. Satellite air navigation procedures will therefore have to be developed. Operational continuity is essential for the operations during the transition to EGNOS V3 and the implementation of the PBN (performance-based navigation) regulation. ESSP is committing and proud to be part of the EGNOS journey that also helps the goal of Carbon Neutrality in Europe in 2050.

In the maritime domain, ESSP continues with the support to the EGNOS Maritime Service Implementation Plan (EMSIP) and looking forward to implementing the new SBAS-L1 EGNOS Maritime service in 2024.

The EGNOS programme and ESSP effort to bring major improvements in the system were implemented in the system release 2.4.2A+ which was deployed by ESSP in October 2021. This version contained the rationalisation of the system architecture, resolution of obsolescence issues as well as the qualification of the GPSIII configuration types into the system.

ESSP keeps being very responsive and efficient towards EGNOS Programme needs in the support to the definition and the evolution of the services. As an example the contribution to an updated Service Definition Document (EGNOS SDD) version 3.4 published in May 2021 was accomplished, following the withdrawal of the United Kingdom from the European Union..

ESSP quickly reacted and adapted to the pandemic constraints, nowadays with mature new virtual ways of communicating with the users: The EGNOS annual workshop with the users in 2021 was a full virtual event considered a success with around 500 participants and with dynamic videos and presentations. Moreover, several webinars have been led by ESSP in the frame of EGNOS promotion.

In terms of EGNOS performance, it is even better than the values committed in the Open Service, Safety-of-Life, and EDAS Service Definition Documents. Nonetheless, the southwest was slightly degraded due to disturbed ionospheric conditions linked to the ramp up of solar activity, and the northeast due to geomagnetic storms and the temporary decommissioning of GPS satellite PRN22.

Once of the biggest challenge ESSP, EUSPA and in general the EGNOS Programme faced during the period was a risk of service loss. The service was provided nominally, but was affected by a risk of Common Mode Failure (CMF) due to a software anomaly identified by ESSP in January 2022. Thanks to the strong involvement of a dedicated task force, the solution was implemented in the EGNOS system in coordination with all the stakeholders in less than 4 months. ESSP managed successfully this contingency situation at all levels: service, operations, safety, security, certification and communication; which finalised with the successful deployment of the correction as part of the EGNOS system release YSR5-PSS1 in May 2022 and with no service interruption. I would like to highlight the good ESSP management of human resources in that difficult period and the commitment from ESSP staff, together with the other stakeholders, in the fast resolution of the contingency for this risk of service loss, which implied working days and nights in an exceptional H24 scheme for ESSP engineers. This issue has been very well coordinated by ESSP staff with the other stakeholders and should be given as an example of a Team management achievement.

The deployment of robust security practices throughout the overall ESSP Company has been proven efficient and enabled the renewal of the ISO 27001 certificate in March 2022. Additionally, ESSP is maintaining the ANSP and ISO9001 certificates.

Moreover, the management of risk related to EGNOS performance will continue to be a priority to keep the first class EGNOS service provision. Some of these risks include the reallocation of some EGNOS monitoring stations and the management of the upcoming Solar Cycle 25 with the peak expected in 2025. Namely, for the Solar Cycle 25, ESSP in coordination with EUSPA are working in the mitigation actions such as the anticipated communication to users, and assessing how robust the upcoming releases are (namely the ESR 2.4.2B).

ESSP works on “EGNOS export programmes” for ASECNA and, KARI (the Korean Aerospace & Research Institute) with a third contract signed with the future Korean Service Provider (IntoSpace) in March 2021.

I would like to thank the ESSP teams for their commitment, our partners and subcontractors for adapting to the situation and helping to maintain first-class services, and our customer EUSPA for their continued trust.

Charlotte Neyret
CEO, ESSP SAS

2 EXECUTIVE SUMMARY

This document covers the period from 1 April 2021 to 31 March 2022.

2.1 EGNOS Service Performance

EGNOS service performance has been good, providing consistent values with those committed in the Open Service, Safety-of-Life, and EDAS Service Definition Documents.

EGNOS Safety of Life (SoL) Service – Non-Precision Approach (NPA)		
NPA Availability	97.65% coverage of the 99.9% NPA Service Area (EGNOS SoL SDD v3.4)	
NPA Integrity	No integrity event for any of the monitoring sites	
NPA Continuity	Values below 5.10^{-4}/h in continental Europe	
EGNOS Safety of Life (SoL) Service – Approach with Vertical Guidance (APV-I)		
APV-I Availability	98.09% coverage of the 99% APV-I Service Area (EGNOS SoL SDD v3.4)	
APV-I Integrity	No APV-I integrity event	
APV-I Continuity	99.28% coverage of the $5{\cdot}10^{-4}$ APV-I Service Area (EGNOS SoL SDD v3.4)	
EGNOS Safety of Life (SoL) Service – LPV-200		
LPV-200 Availability	95.44% coverage of the 99% LPV-200 Service Area (EGNOS SoL SDD v3.4)	
LPV-200 Integrity	No LPV-200 integrity event	
LPV-200 Continuity	91.36% coverage of the $5{\cdot}10^{-4}$ LPV-200 Service Area (EGNOS SoL SDD v3.4)	
LPV-200 Accuracy Tails	No events happened during the period	
EGNOS Open Service (OS)		
Horizontal Accuracy	1.0metres (95th percentile of the cumulative data for all stations)	
Vertical Accuracy	1.5metres (95th percentile of the cumulative data for all stations)	
Open Service Availability	Above 99% for all locations	
EGNOS Data Access Service (EDAS)		
Service	Availability	Latency
Service Level 0	99.99% vs 98.5% target (EDAS SDD)	718.63 ms vs 1300 ms target (EDAS SDD)
Service Level 2	99.99% vs 98.5% target (EDAS SDD)	719.16 ms vs 1450 ms target (EDAS SDD)
Ntrip	99.99% vs 98% target (EDAS SDD)	623.10 ms vs 1750 ms target (EDAS SDD)
SISNeT	99.98% vs 98% target (EDAS SDD)	54.60 ms vs 1150 ms target (EDAS SDD)
Data Filtering	99.99% vs 98% target (EDAS SDD)	499.45 ms vs 1750 ms target (EDAS SDD)
FTP	100% vs 98% target (EDAS SDD)	N/A
Signal-In-Space (SIS) Availability		
PRN123 (EGNOS OP)	99.997 %	
PRN136 (EGNOS OP)	99.999 %	
EGNOS OP (at least one SIS)	100%	

Table 1: EGNOS service performance from the April 2021 – March 2022 period

The leading causes for the observed EGNOS Service performance degradations were the following:

- *EGNOS OS and SoL services:*
  - **GPS monitoring:** Problems related to monitoring one or more GPS satellites (e.g. non-monitored satellites due to the lack of visibility from the EGNOS reference stations, satellites set to 'Don't use'/'Not Monitored') are one of the most frequent causes of observed underperformance. This monitoring loss of some satellites has been especially significant in performance impact during periods with degraded ionosphere monitoring conditions.

    This type of problem has significantly decreased compared to the preceding year (approximately 35% of the daily underperformance events vs 59% in the preceding period), mainly due to the rising importance of ionosphere monitoring problems.
  - **Ionosphere monitoring:** the EGNOS ionosphere monitoring problems affected mainly the north and southwest of the Service Area. During recent months, it has become one of the main causes of observed underperformance, with a larger impact regarding the preceding yearly period (approximately 35% of the daily underperformance events vs 14% in the preceding period). The main reason is the increase in solar activity due to solar cycle #25, which has increased ionospheric disturbances.
  - **NANUs:** The publication of NANUs that declare certain satellites as temporarily not usable has impacted the EGNOS service performance on specific days in most of the Service Area. The most notable degradation took place in December due to the 12-day overlap of NANU 2021058 affecting PRN22 and NANU 2021061 affecting PRN27 (from December 15th to 27th).

    Globally, this issue has contributed to around 10% of the daily underperformance events.
- *EDAS:*

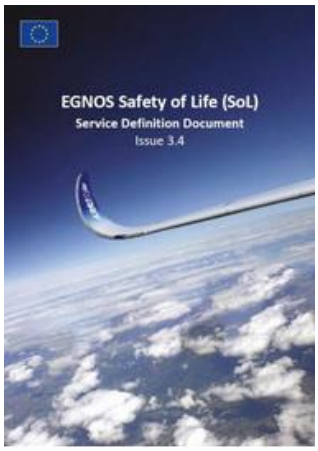
  Very stable services with monthly performances consistently exceeding the committed values defined in the EDAS SDD (Service Definition Document). All EDAS services were available more than 99.95% during the entire period, with transit delays largely below the 1-second threshold.

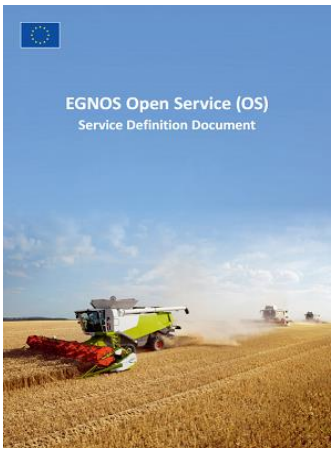
  The main service outage during the reported period took place on 10 August 2021, when an EDAS outage affected SISNeT and Ntrip services during routine hardware maintenance. This event also affected the FTP data availability, although the EDAS FTP site was never offline. .

2.2 Service Provision and Development

- **Service Evolution:**
  - **Service Definition Documents (SDD)**:

Activities towards the publication of several versions of the SoL SDD are ongoing in the SoL service: version 3.4 was accomplished and published in May 2021, due to an update of the SoL service region actively pursued by the Programme (magenta line), following the withdrawal of the United Kingdom from the European Union; a new version 3.5 is under assessment to incorporate recent matters, such as Iceland becoming a new EGNOS participant state and the transition from GSA to EUSPA rename while ensuring the representativeness of the current commitment maps. See section 4.2 for more information.





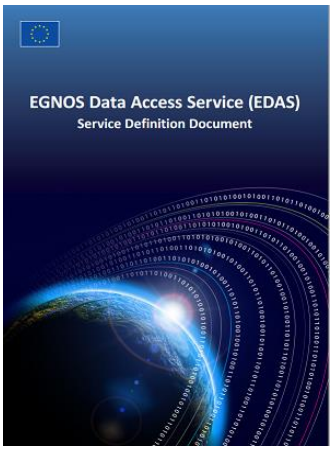


Figure 1: EGNOS Service Definition Documents

There are ongoing activities to update the latest versions of the OS SDD and the EDAS SDD, also related to the abovementioned topics.

  - **Services Notices**:

No publication has been necessary yet. Section 4.2 includes the main information on these Service Notices.

  - **EGNOS Service Implementation Roadmap:**

The EGNOS Services Roadmaps were updated to v5.0 in July 2021, with a new layout and various improvements in content and format.

- **EGNOS Workshop:**
  - The EGNOS Annual Workshop was held online on 2 December 2021, with nearly 500 participants. This one-day online session provided insights into the status and roadmap of EGNOS services, its development, and its implementation in fields such as aviation, maritime, rail and agriculture.
  - The 2022 EGNOS Annual Workshop will take place during the European Space Week as a hybrid event, from 3 to 6 October 2022 in Prague.
- **EGNOS User Satisfaction surveys:**
  - The EGNOS User Satisfaction Survey was launched in December 2021 and closed on 05/04/2022, using the EUSurvey online platform. All of the responses have not been received, and the analysis has not been performed as at the time of creating this report, EUSPA has not yet sent the raw data.
- **EGNOS SoL implementation in aviation:**
  - EGNOS procedures: At the end of the period included in the report (31 March 2022), ESSP was supporting the EGNOS-based operations for 34 countries, 430 airports, and a total of 821 EGNOS-based operations (432 APV-I, 351 LPV-200, 33 APV-Baro EGNOS-based approach procedures, and 5 RNP 0.3 routes). Overall, 64.52% of the instrumental runways in Europe implement EGNOS approaches.

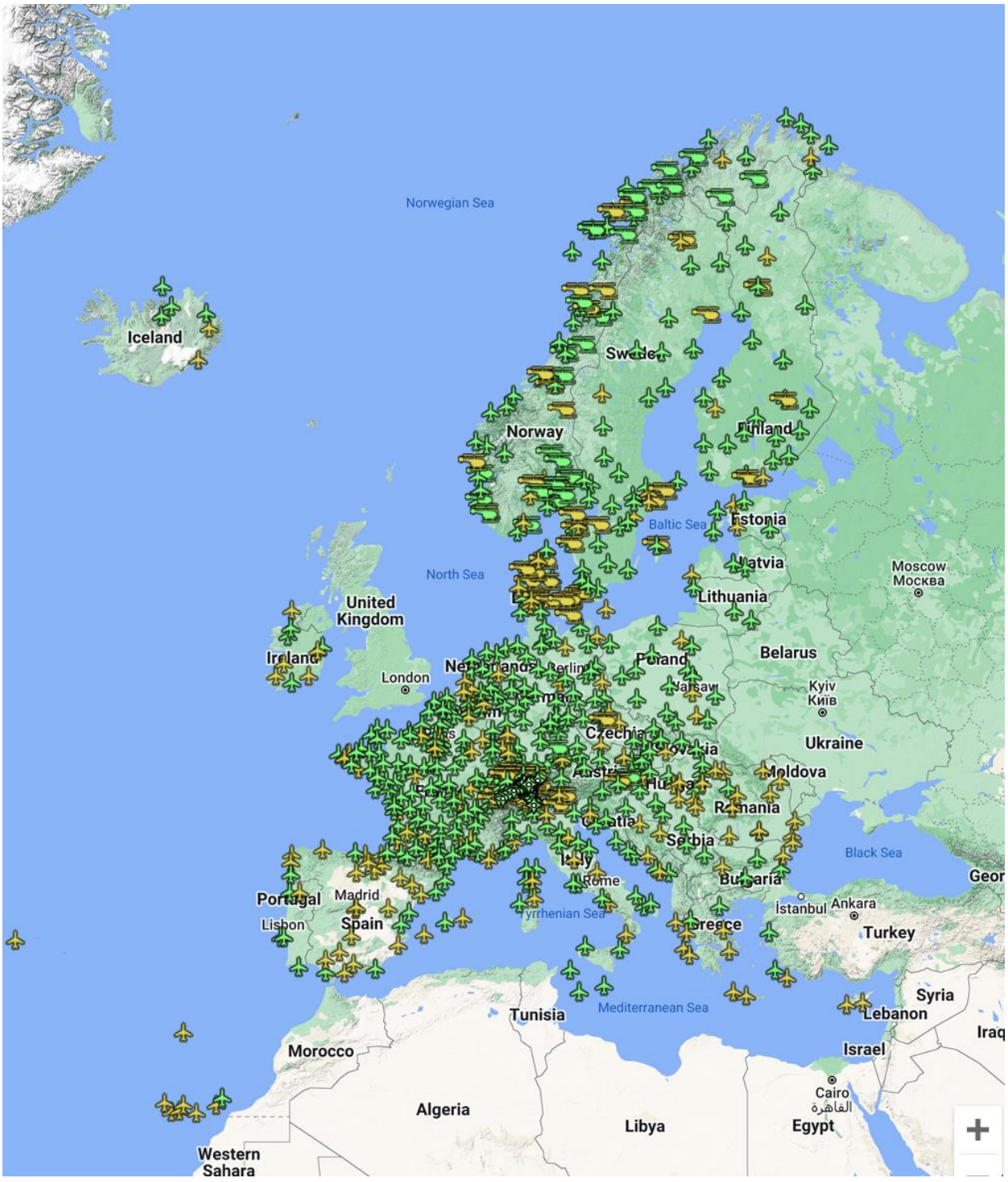


Figure 2: EGNOS Procedures map (EGNOS User Support Website)

- **User Service Implementation:**
  - EGNOS Multimodal Adoption:
    - All planned activities for 2021 were successfully executed. The market segments where more effort has been devoted are aviation and maritime, followed by agriculture and geomatics, and rail.
    - ESSP and EUSPA have continued engaging aerodromes to publish the EGNOS-based procedures and encouraging operators to get equipped and certified. During the period reported in this document, 32 LPV, 51 LPV200, 2 LPV200(Hel) and 30 PinS were published, for a total of 115 EGNOS-based procedures in this period

and 39 more aircraft/rotorcraft units were engaged so that in the near future they will retrofit, initiate the certification process, or request SBAS options in the avionics for new unit orders.

- In the maritime domain, the activities related to the use of the EGNOS V2 SiS or EDAS as a positioning source for Aids to Navigation (IALA DGNSS stations and AIS stations) have continued. Contact has been established with Croatian maritime and inland waterways authorities to offer support (through the preparation of a customised technical feasibility assessment and cost-benefit analysis) to recapitalise their AIS stations.
- In agriculture and geomatics, the contacts network has notably increased and customised EGNOS information for those market segments has been prepared and disseminated. More presence in specialised forums in precision farming has been achieved, as well as closer contact with many universities.
- In the rail sector, ESSP has continued supporting the EUSPA with a special focus on market size assessment of European freight wagons to be equipped with GNSS tracking devices (non-SoL market). Nearly 200,000 freight assets are to be retrofitted by 2022 with EGNSS receivers. By 2021 it was confirmed that 156,000 smart assets in Europe had already been equipped with EGNSS telematics devices. These figures were compiled in a brochure to raise awareness of these results.

- **User Support:**
  - EGNOS Helpdesk activities:
    - During this period, the EGNOS Helpdesk managed 222 user requests.
    - From the total number of received questions, 18 were catalogued as urgent requests (asking about the current status of the EDAS service or a technical failure of the EGNOS system), and 11 were received by phone.
    - On average, the number of questions per month was 18.5, while the average number of iterations per month was 42.17, making an average of 2.27 iterations per user question.
    - Most of the requests were related to the EDAS Registrations (23%).
    - The User Support team also supported the GSA to EUSPA transition and different crisis communication plan preparations.
  - EGNOS User Support Website activities:
    - The EGNOS User Support Website has 3837 registered users. There were 321 new registered users in this period.
    - The EGNOS User Support website continued its evolution, adding new tools, such as:
      - Environmental assessment added to the EBCAST Tool and improvements in the EASE tool.
      - Improvements in LPV Map update process on AIRAC.

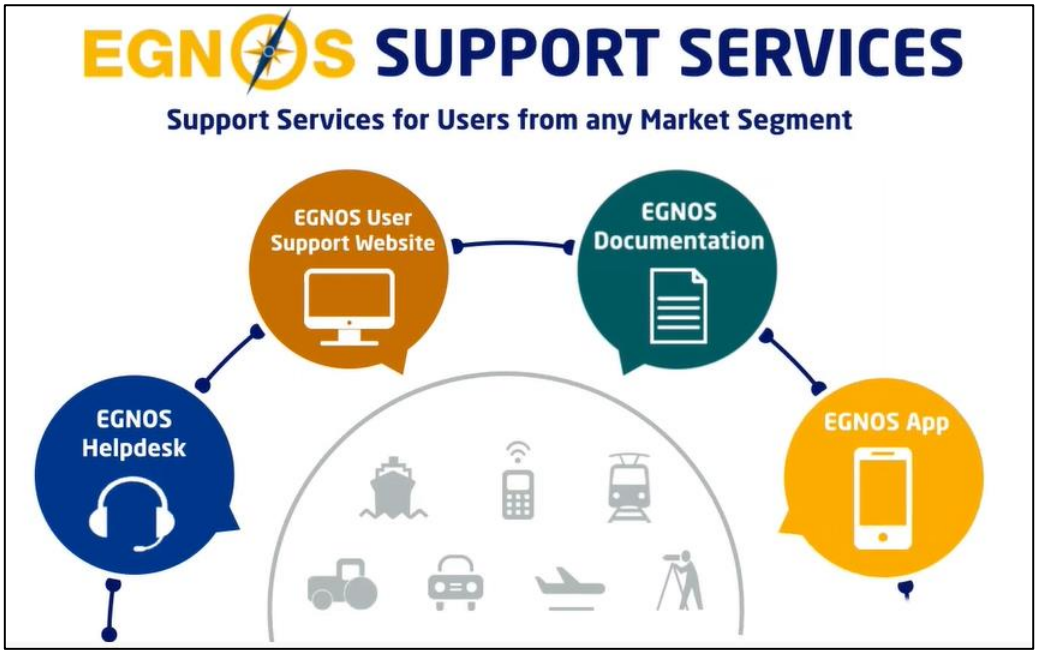


Figure 3: EGNOS Support Services

3 SERVICE PERFORMANCE

3.1 EGNOS SIS Availability

3.1.1 SIS Availability trending

Definition
Individual GEO availability: Percentage of time each geostationary satellite broadcasts a valid EGNOS SIS. A valid SIS is defined as a Signal-In-Space compliant with ICAO SARPS and RTCA MOPS.
Combined GEO availability: Percentage of time in which at least one geostationary satellite in the EGNOS operational configuration (EGNOS-OP) broadcasts a valid EGNOS SIS. A valid SIS is defined as a Signal-In-Space compliant with ICAO SARPS and RTCA MOPS.

This section presents the performance of the SIS availability. It provides the yearly average performances for each GEO of the Operational EGNOS segregation, namely PRN123 and PRN136.

- Individual GEO availability - PRN136: 99.999 %
- Individual GEO availability - PRN123: 99.997 %
- Combined GEO availability: 100 %

The following figure shows the monthly results:

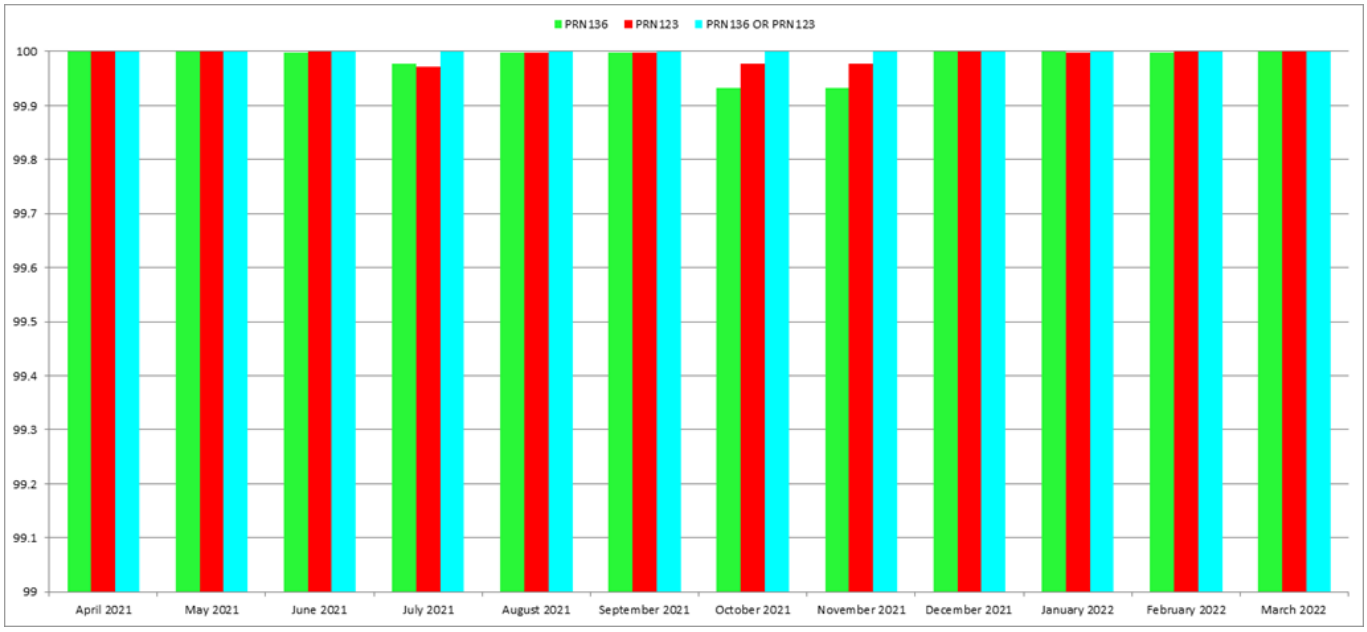


Figure 4: EGNOS SIS OP availability trend: from April 2021 to March 2022 (%)

Information on the EGNOS GEOs' footprint is available on the EGNOS User Support Website.

The following table shows the numerical values for each month and each PRN:

DATE	OP1: PRN136	OP2: PRN123	OP1 OR OP2
April 2021	100	99.9999	100
May 2021	99.9991	99.9991	100
June 2021	99.9986	99.9995	100
July 2021	99.9780	99.9715	100
August 2021	99.9986	99.9979	100
September 2021	99.9985	99.9975	100
October 2021	99.9326	99.9765	100
November 2021	99.9326	99.9765	100
December 2021	99.9991	99.9991	100
January 2022	99.9996	99.9986	100
February 2022	99.9986	99.9996	100
March 2022	99.9995	99.9995	100
Average Monthly availability	99.9987	99.9975	100

Table 2: EGNOS OP SIS - Monthly availability from April 2021 to March 2022 (%)

3.2 SoL Service – Non-Precision Approach (NPA)

The following figures show the minimum performance for the Non-Precision Approach (NPA) availability and continuity that can be expected from EGNOS, as defined in the EGNOS SoL Service Definition Document (see EGNOS SoL Service Definition Document). Version v3.4 of the SoL SDD was published on 04/05/2021. Nevertheless, the commitment area of the performance maps was not updated compared to the preceding version.

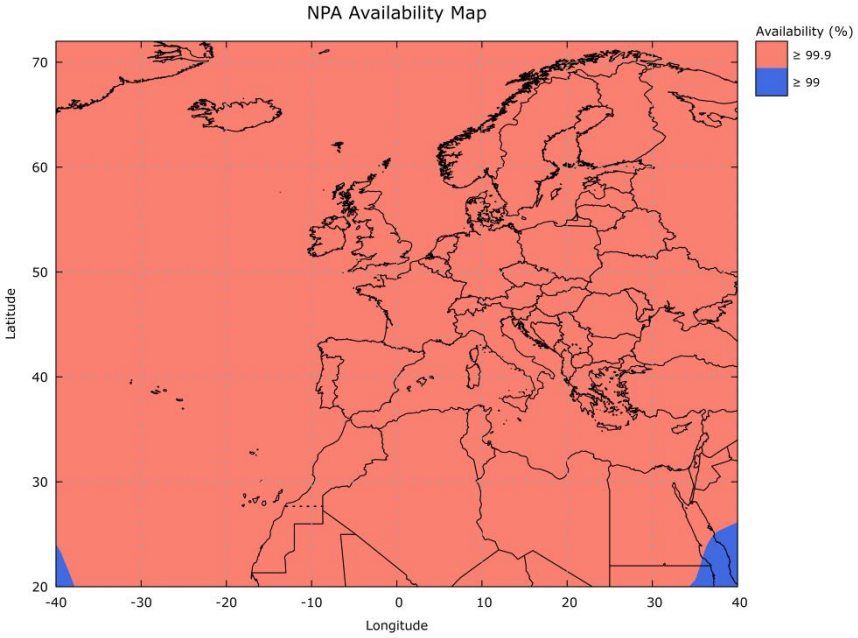


Figure 5: NPA Availability map- Expected minimum performance (SoL SDD v3.4)

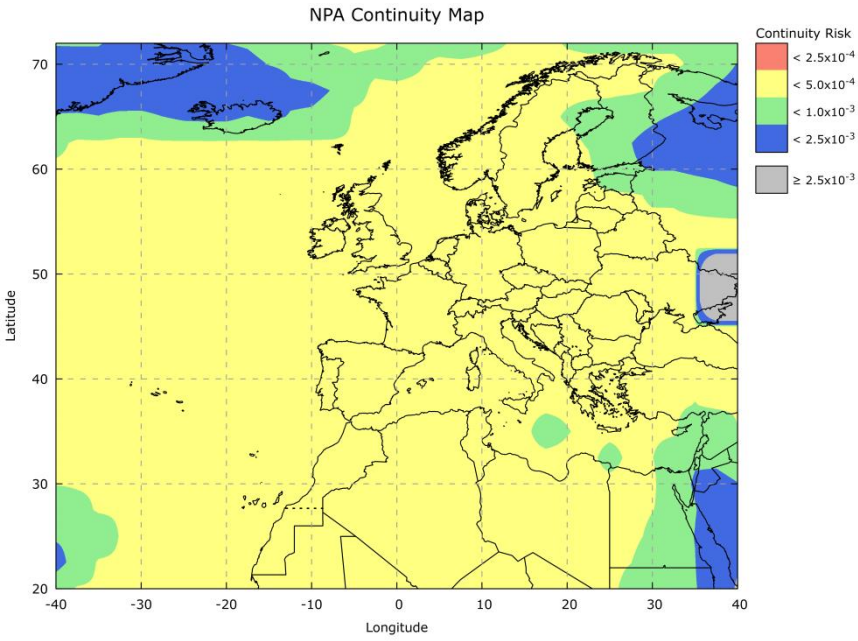


Figure 6: NPA Continuity map - Expected minimum performance (SoL SDD v3.4)

These values correspond to the expected performance measured by a fault-free receiver using all GPS satellites in view for one month, using all operational EGNOS GEOs.

The NPA performance achieved during the reporting period is reported below. Additionally, the NPA performance is conveyed through the EGNOS Monthly Performance reports, available on the EGNOS User Support website.

3.2.1 NPA availability

EGNOS NPA Availability *is defined as the percentage of samples in which the Horizontal Protection Level (HPL) is below the Alert Limit for NPA (HAL: 556m), computed over the total period.*

The following figure shows the NPA availability for the reported period for combined GEO (understood as the use of corrections from either one of the two operational GEOs, switching between each one of them in the event an SIS outage longer than three seconds is observed):

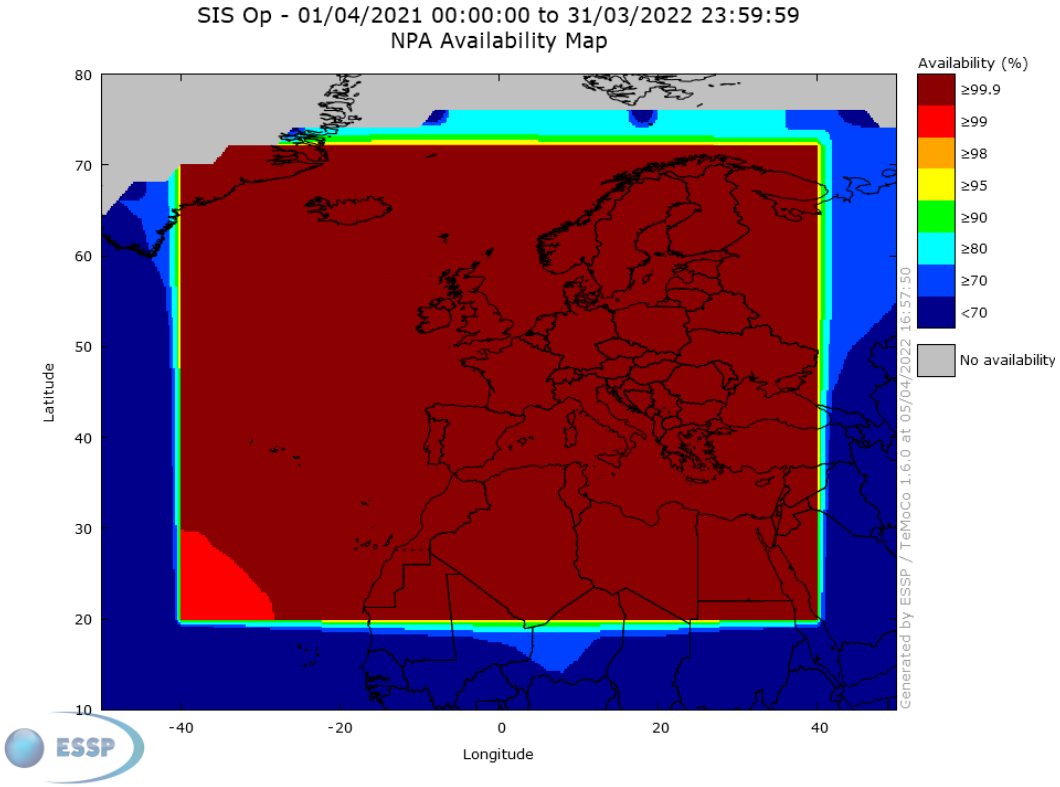


Figure 7: NPA Availability from 01/04/21 to 31/03/22

The NPA availability performance was excellent during the reporting period: greater than 99% over the entire NPA Service Area[1] except for a very small region over Greenland due to the lack of visibility of the EGNOS operational GEO satellites (GEO-1/PRN136 and GEO-2/PRN123).

[1] The NPA Service Area is the 99% NPA availability area shown in **Error! Reference source not found.** from the EGNOS Safety of Life SDD. It corresponds to the MT27 area.

3.2.2 NPA availability – Achievement against target

The following figure shows the combination of the 99% NPA Availability map and the NPA Service Area[1]. It should be noted that the northwest corner was not covered by the GEO footprint during the reporting period.

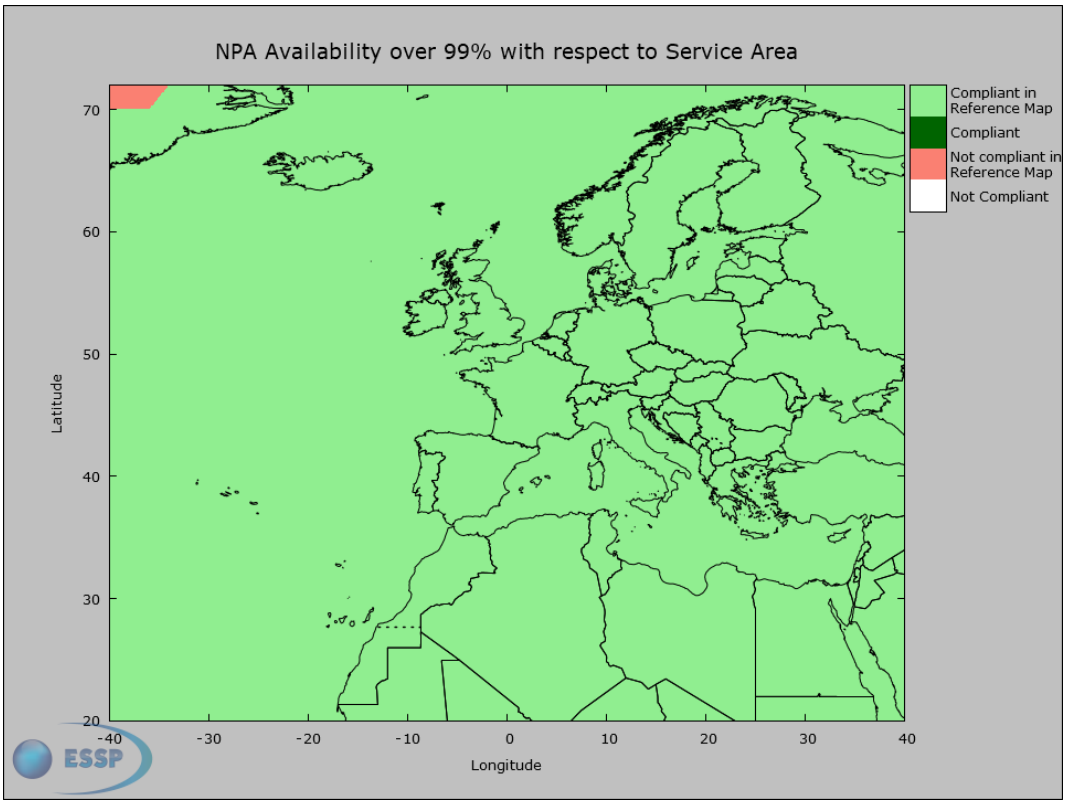


Figure 8: NPA Availability map regarding the Service Area – from 01/04/21 to 31/03/22

In the picture, the legend should be read as follows:

- **Compliant in Reference Map**: The part of the Service Area[1] where the NPA availability was above 99%.
- **Not compliant in Reference Map**: The part of the Service Area[1] where the NPA availability was lower than 99%.

As shown in the figure above, the NPA availability was greater than 99% over the area where the EGNOS GEOs were visible for the reporting period.

Considering the SoL SDD v3.4 commitments as the reference, the percentage of compliant points with the 99.9% NPA Service Area is **97.65%**, and with the 99%, NPA commitment is **99.73%** (this last figure corresponds to 100% of the 99% NPA Service Area not affected by the lack of visibility of EGNOS GEOs). Note that the comparison concerning the SDD SoL commitment map is included for information purposes. The commitment map is a monthly reference, while the reported period is one year. Consequently, this comparison must be interpreted with care.

3.2.3 NPA Integrity

EGNOS NPA Integrity Event *is defined as an event in which the Navigation System Error is greater than or equal to the corresponding Protection Level for NPA.*

The ***Safety index*** *is defined as the Navigation System Error versus the Protection Level ratio (assuming the NPA algorithms to compute xNSE and xPL) for each second. If the xNSE/xPL ratio is over 1, it indicates that a Misleading Information situation has occurred.*

Table 3 shows the maximum HSI at each RIMS inside the NPA Service Area (Figure 5).

Station	HSI	Station	HSI
Abu Simbel	0.28	Kirkenes	0.20
Azores	0.22	Lappeenranta	0.17
Agadir	0.36	La Palma	0.28
Aalborg	0.19	Lisbon	0.23
Alexandria	0.24	Madeira	0.24
Athens	0.19	Malaga	0.27
Berlin	0.20	Palma de Mallorca	0.31
Canary Islands	0.33	Reykjavik	0.17
Cork	0.21	Roma	0.24
Catania	0.20	S. de Compostela	0.27
Djerba	0.39	Sofia	0.25
Egilsstadir	0.21	Swanwick	0.27
Glasgow	0.22	Toulouse	0.21
Golbasi	0.22	Trondheim	0.22
Gävle	0.19	Tromsoe	0.26
Haifa	0.23	Warsaw	0.20
Jan Mayen	0.25	Zürich	0.20

Table 3: NPA Safety Index (maximum) at reference stations

None of the RIMS stations inside the SDD commitment area was impacted by integrity events in the position domain during the analysed period.

The following figure provides the HSI (Horizontal Safety Index) histogram, collecting measurements from the different EGNOS stations and for the operational GEOs over the entire period.

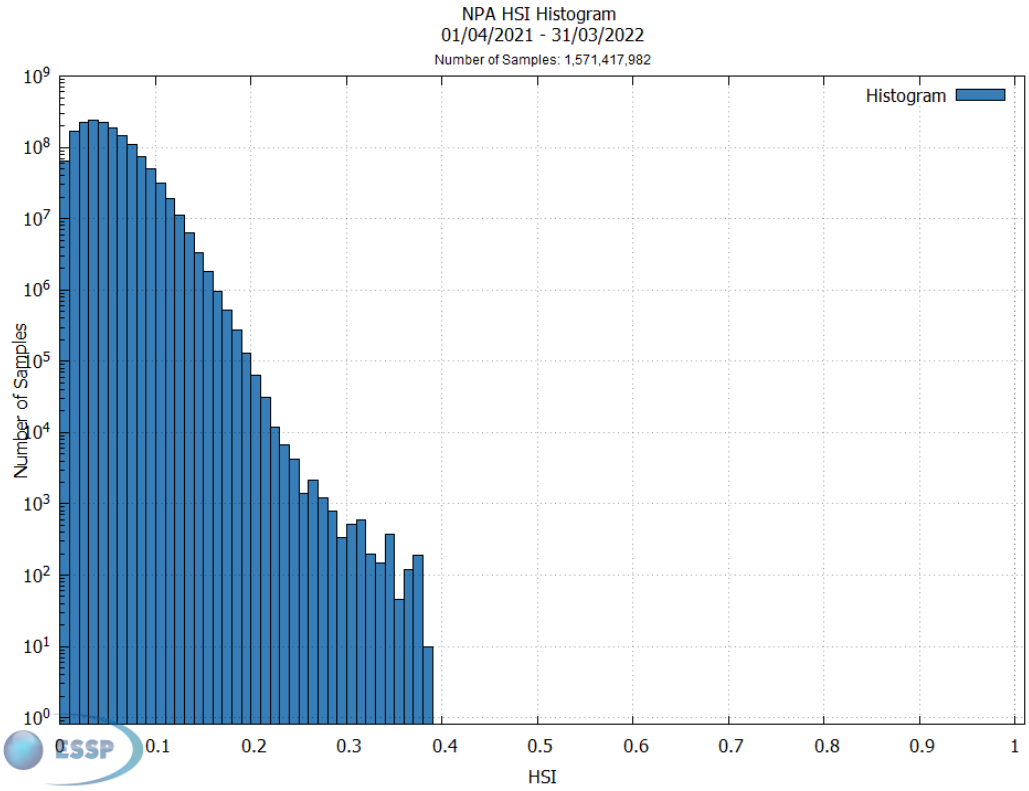


Figure 9: NPA Horizontal Safety Index[2]

[2] Note that some periods may have been removed for the computation of the different histograms presented in this document, corresponding to stations showing poor quality of data linked to the local environment. Data extracted from histograms correspond to data from RIMS where any OR affecting data quality has been observed, the presence of cycle slips affecting performance have been detected, or other data quality issues have been traced as causing daily degradations.

3.2.4 NPA Continuity

EGNOS NPA Continuity *is computed by dividing the total number of single continuity events, using a time-sliding window of one hour, by the number of samples with a valid and available NPA navigation solution. A single continuity event occurs if the system is available at the start of the operation and, in at least one second within the following time-sliding window of one hour, the system becomes unavailable.*

The following figure shows the NPA Continuity Risk obtained for the GEO, combined over the entire analysed period.

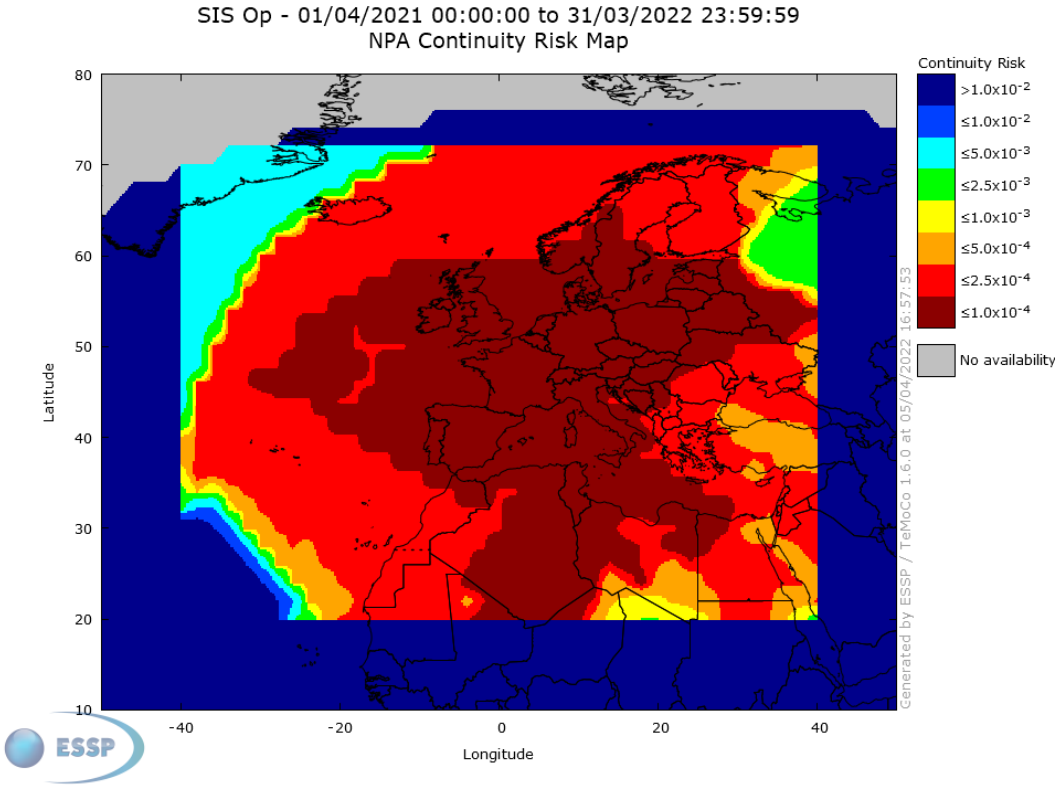


Figure 10: NPA Continuity Risk from 01/04/21 to 31/03/22

As shown in the preceding figure, most of the MT27 Service Area presents a continuity risk lower than $5 \cdot 10^{-4}$ except for the corners where the performance achieved is slightly worse, mainly due to the lower number of GPS satellites monitored from these regions.

3.3 SoL Service – APproach with Vertical guidance (APV-I)

The following figures show the minimum performance expected from EGNOS for Approach with Vertical guidance (APV-I) availability and continuity, as defined in the EGNOS SoL Service Definition Document. Version v3.4 of the SoL SDD was published on 04/05/2021. Nevertheless, the commitment area of the performance maps was not updated from the preceding version.

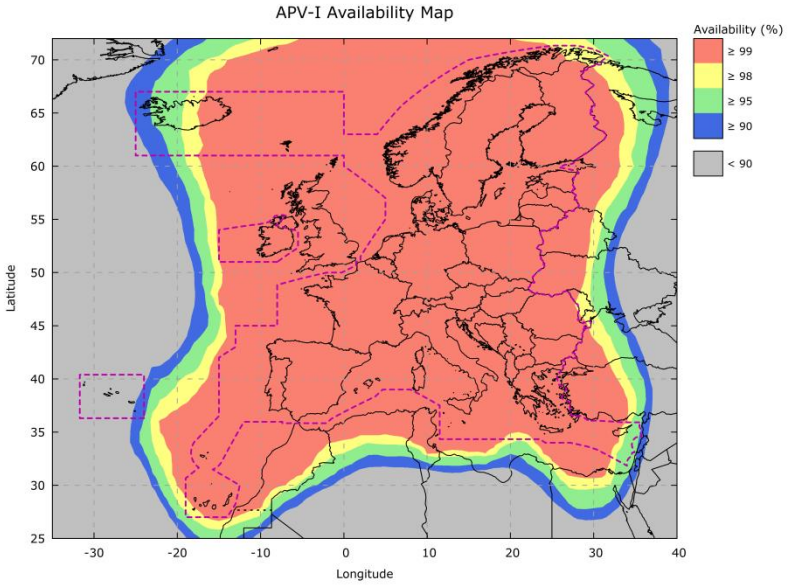


Figure 11: APV-I Availability map- Expected minimum performance (SoL SDD v3.4)

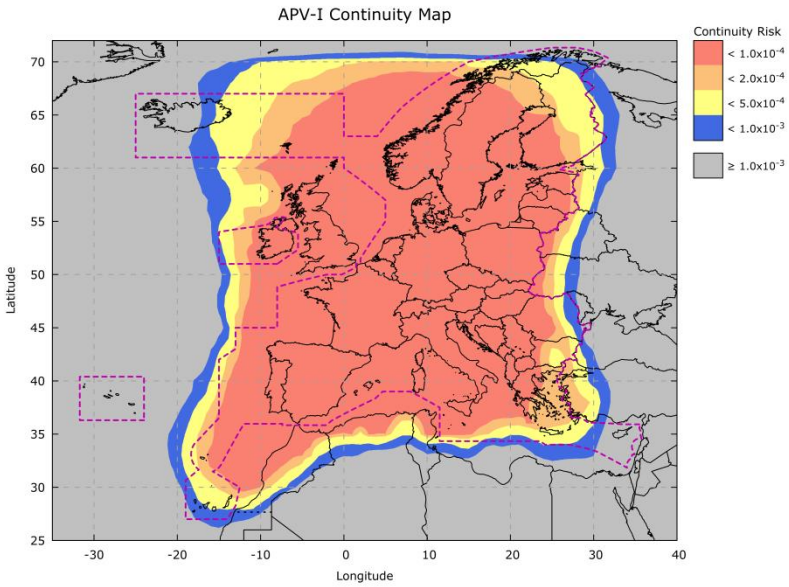


Figure 12: APV-I Continuity map - Expected minimum performance (SoL SDD v3.4)

These values correspond to the expected performance measured by a fault-free receiver using all satellites in view when averaging over one month, using all operational EGNOS GEOs.

The achieved APV-I performance during the reporting period is reported below. Additionally, APV-I performance is reported through the EGNOS Monthly Performance reports, available on the EGNOS User Support website.

3.3.1 APV-I availability

EGNOS APV-I Availability *is defined as the percentage of epochs in the period in which the Protection Level (both HPL and VPL) is below Alert Limits for this APV-I service (HAL: 40m; VAL: 50m) over the total period.*

The following figure shows the APV-I availability map for the combination of the operational GEOs during the reported period:

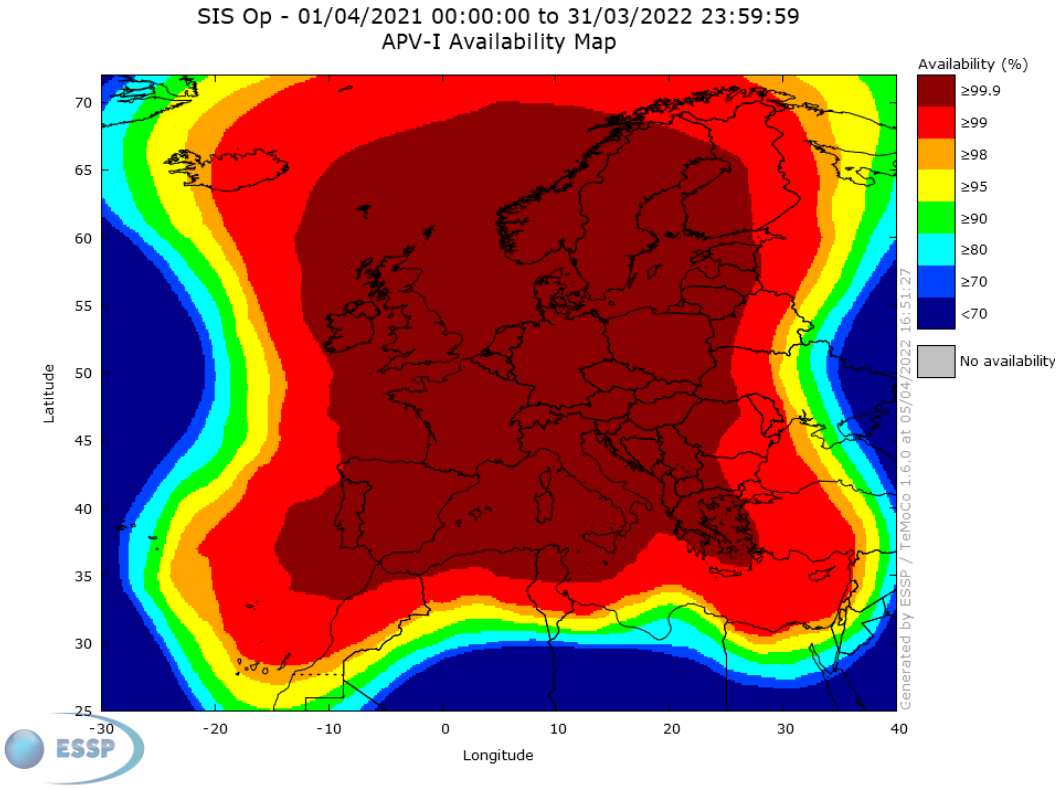


Figure 13: APV-I Availability from 01/04/21 to 31/03/22

The APV-I availability performance was excellent during the reporting period: the coverage of the 99% APV-I Service Area[3] is complete, except for the Canary Islands and other minor areas in the borders.

[3] 99% APV-I Service Area is the 99% APV-I availability area shown in **Error! Reference source not found.** obtained from the EGNOS Safety of Life SDD.

The following figure shows the annual APV-I availability compliance of the target at airports with published EGNOS-based operations:

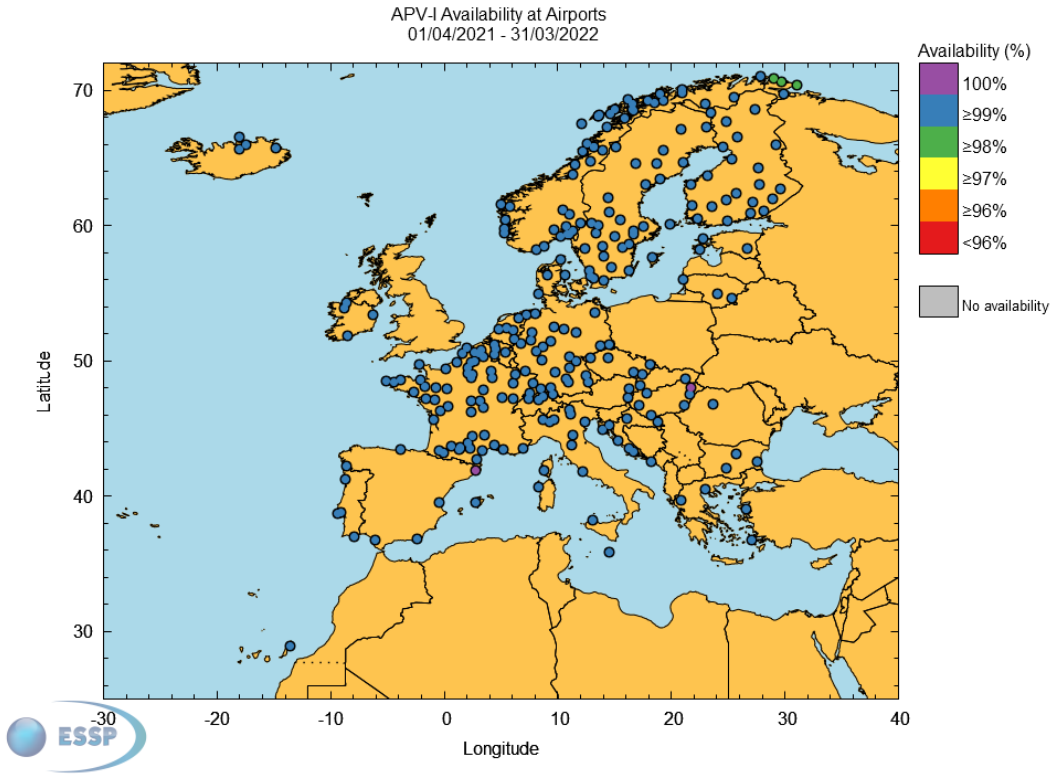


Figure 14: Annual APV-I Availability compliance at airports with published EGNOS-based operations

Moreover, the SoL SDD v3.4 commitment was met monthly for the APV-I service availability during the entire reporting period at all airports with the EGNOS-based operations, except for the following:

- Karasjok (XZKS) Airport (Norway) in December 2021.
- Ivalo (EFIV) Airport (Finland) in December 2021.
- Båtsfjord (ENBS), Berlevåg (ENBV) and Vardø/Svartnes (ENSS) Airports (Norway) in December 2021 and February 2022.
- Lanzarote AD (GCRR) Airport (Spain) in February and March 2022.

For additional information, please refer to the corresponding Monthly Performance Reports.

3.3.2 APV-I availability – Achievement against target

The combination of the 99% APV-I Availability map and the 99% APV-I Service Area[3] produces the following:

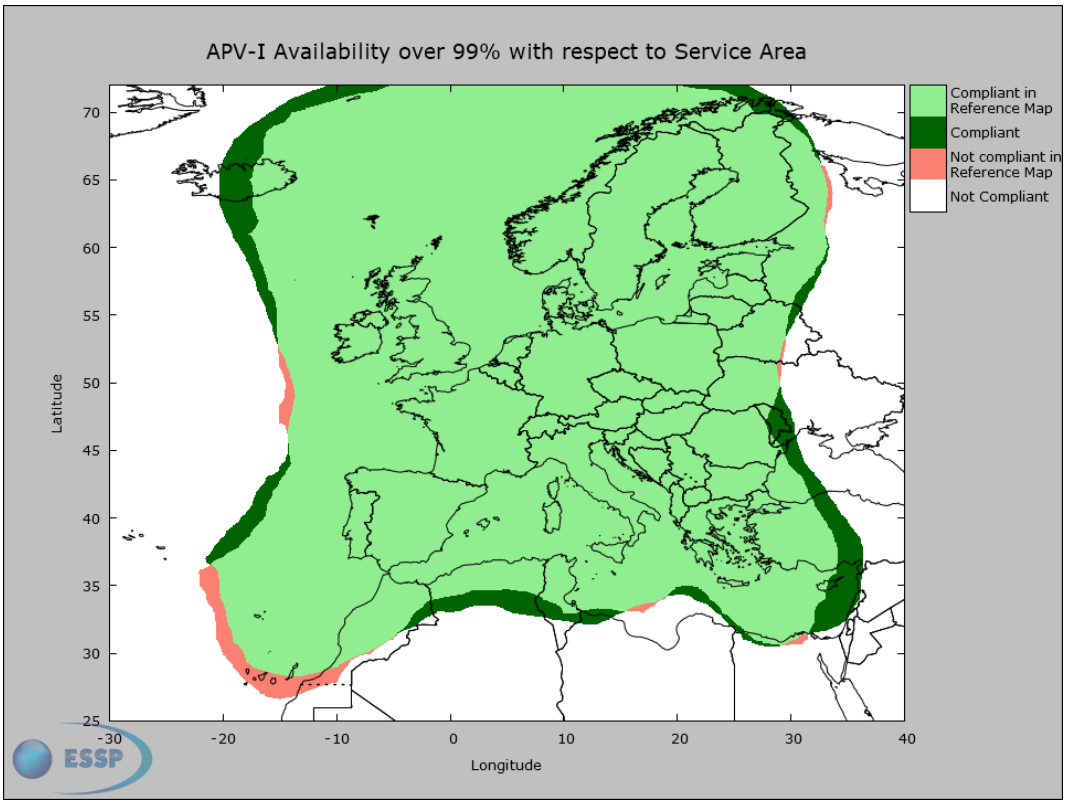


Figure 15: APV-I 99% Availability map regarding the 99% APV-I Service Area[3] – from 01/04/21 to 31/03/22

In the figure, the legend should be read as follows:

- **Compliant in Reference Map**: The part of the Service Area[3] where APV-I availability was above 99%.
- **Compliant**: The zone out of the Service Area[3] where APV-I availability was also above 99% (coverage extension regarding the commitment).
- **Not compliant in Reference Map**: The part of the Service Area[3] where APV-I availability was lower than 99%.
- **Not compliant (white)**: Any other zone out of the Service Area[3] where APV-I availability is lower than 99%.

The percentage of points compliant with the 99% APV-I Service Area[3] is **98.09%**. Some small areas in the west, northeast, east and southeast presented underperformance, mainly associated with weak GPS constellation geometry. Focusing on the southwest of the Service Area, the reduced coverage in this region was mainly due to disturbed ionospheric conditions associated with the ramp-up of solar activity.

Note that the comparison regarding the SDD SoL commitment map is included for information purposes. The commitment map is a monthly reference, while the reported period is one year; therefore, this comparison must be interpreted with care.

3.3.3 APV-I Integrity events

EGNOS APV-I Integrity Event *is defined as an event in which the Navigation System Error is greater than or equal to the corresponding Protection Level for APV-I.*

No integrity events were detected.

The ***Safety Index*** *is defined as the Navigation System Error versus the Protection Level ratio (assuming PA algorithms to compute xNSE and xPL) for each second. If the xPE/xPL ratio is over 1, it indicates that a Misleading Information situation has occurred.*

Table 4 shows the maximum HSI and VSI at each RIMS inside the APV-I Service Area (see Figure 11 and Figure 12). Moreover, Stanford plots are available on the EGNOS User Support Website.

Station	HSI	VSI	Station	HSI	VSI
Agadir	0.28	0.31	Lappeenranta	0.20	0.25
Aalborg	0.28	0.30	La Palma	0.27	0.23
Alexandria	0.24	0.23	Lisbon	0.31	0.24
Athens	0.20	0.20	Madeira	0.27	0.23
Berlin	0.21	0.27	Malaga	0.28	0.23
Canary Island	0.29	0.24	Palma de Mallorca	0.32	0.27
Cork	0.24	0.24	Reykjavik	0.21	0.23
Catania	0.21	0.24	Roma	0.25	0.25
Djerba	0.33	0.24	S. de Compostela	0.28	0.33
Egilsstadir	0.21	0.28	Sofia	0.26	0.33
Glasgow	0.24	0.27	Swanwick	0.28	0.26
Golbasi	0.18	0.20	Toulouse	0.21	0.22
Gävle	0.24	0.29	Trondheim	0.24	0.26
Haifa	0.24	0.33	Tromsoe	0.27	0.38
Jan Mayen	0.26	0.31	Warsaw	0.21	0.24
Kirkenes	0.23	0.29	Zürich	0.21	0.23

Table 4: EGNOS APV-I Safety Index (maximum) at reference stations

The following figures provide the HSI (Horizontal Safety Index) and the VSI (Vertical Safety Index) histograms for each second when collecting measurements from the different EGNOS stations and for both operational GEOs over the reported period.

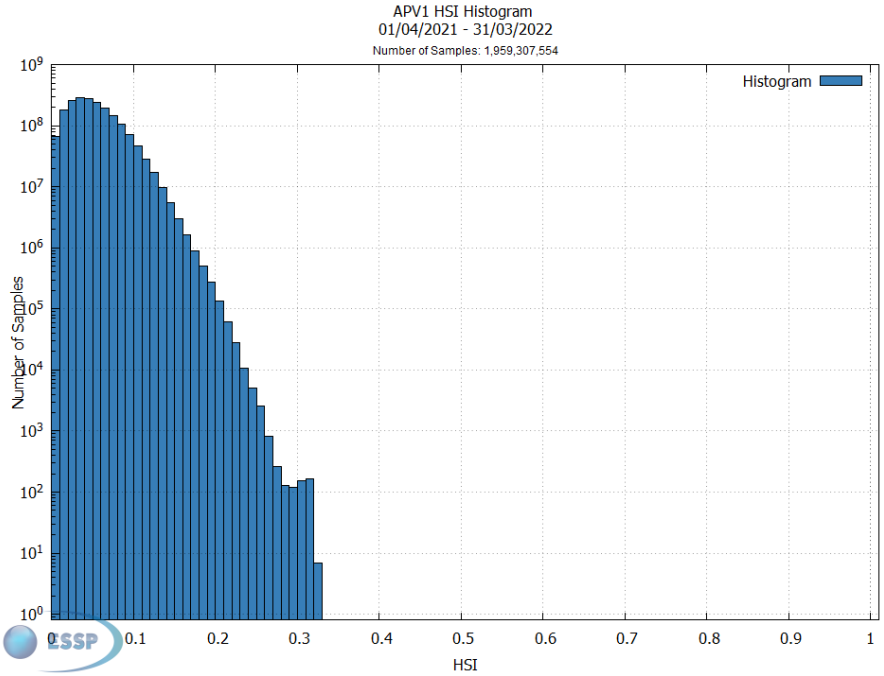


Figure 16: EGNOS APV-I Horizontal Safety Index[4]

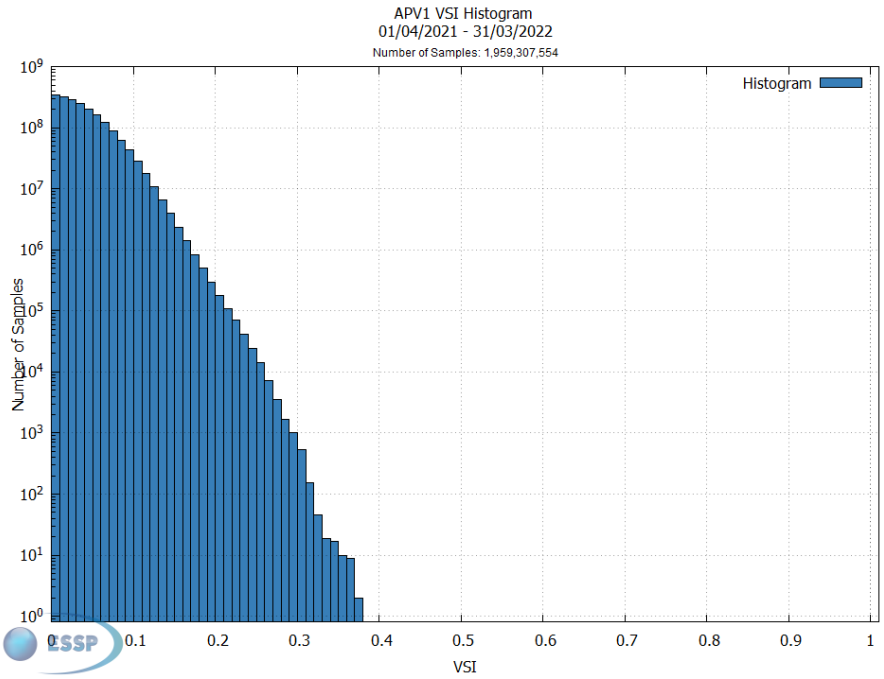


Figure 17: EGNOS APV-I Vertical Safety Index[4]

Previous figures show that the horizontal and vertical safety index for APV-I remained below 0.33 and 0.38, respectively, representing a particularly favourable safety margin for all stations.

[4] Note that some periods may have been removed to compute the different histograms presented in this document, corresponding to stations showing poor data quality related to the local environment. Data removed from histograms correspond to data from RIMS where any OR affecting data quality has been observed, where the presence of cycle slips affecting performance is detected, or other data quality issues have been traced as causes of daily degradations.

3.3.4 APV-I Continuity risk

EGNOS APV-I Continuity Risk *is defined as the result of dividing the total number of single continuity events, using a time-sliding window of 15 seconds, by the number of samples with a valid and available APV-I navigation solution. A single continuity break occurs if the system is available at the start of the operation and becomes unavailable during one of the following 15 seconds.*

The following figure provides the GEO combined APV-I continuity risk for the reported period:

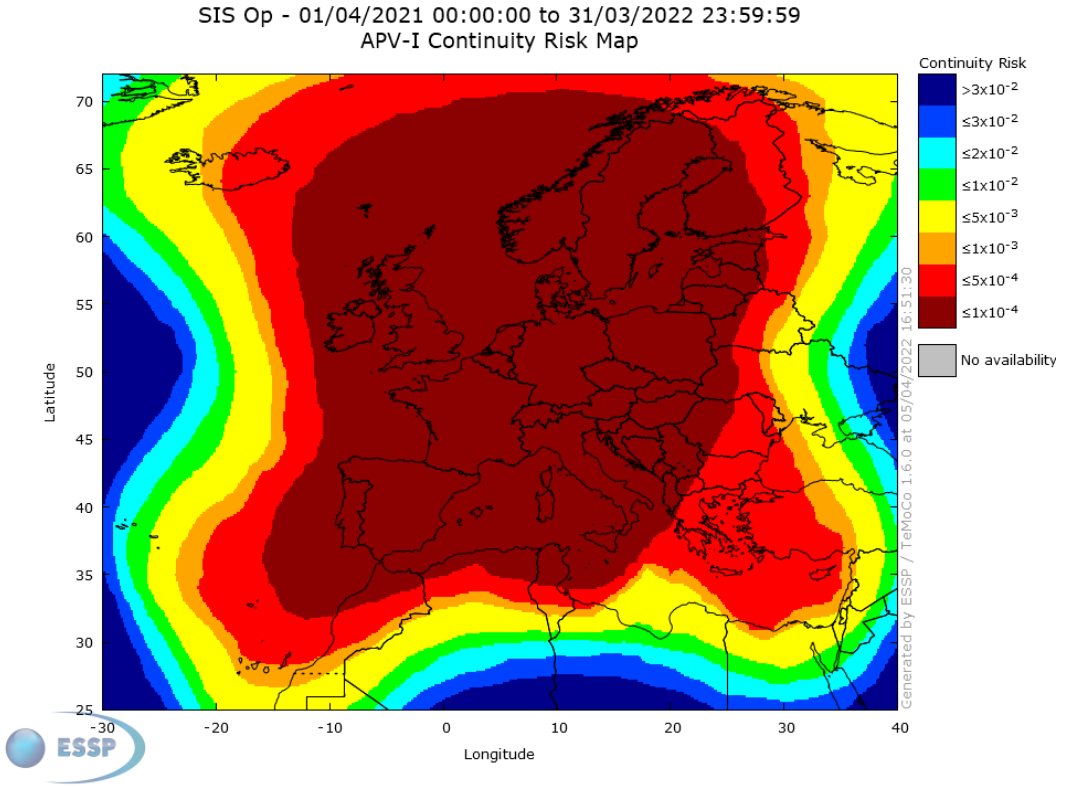


Figure 18: APV-I Continuity Risk from 01/04/21 to 31/03/22

The APV-I continuity performance was excellent during the reporting period: lower than $5{\cdot}10^{-4}$ over almost the entire $5{\cdot}10^{-4}$ APV-I Service Area[5], with small underperformances observed mainly in the southwest and southeast.

[5] $5{\cdot}10^{-4}$ APV-I Service Area is the $5{\cdot}10^{-4}$ APV-I continuity risk area shown in **Error! Reference source not found.** obtained from the EGNOS Safety of Life SDD v3.4.

3.3.5 APV-I Continuity – Achievement against target

The combination of the 5.10^{-4} APV-I Continuity Risk map and the $5{\cdot}10^{-4}$ APV-I Service Area[5] produces the following:

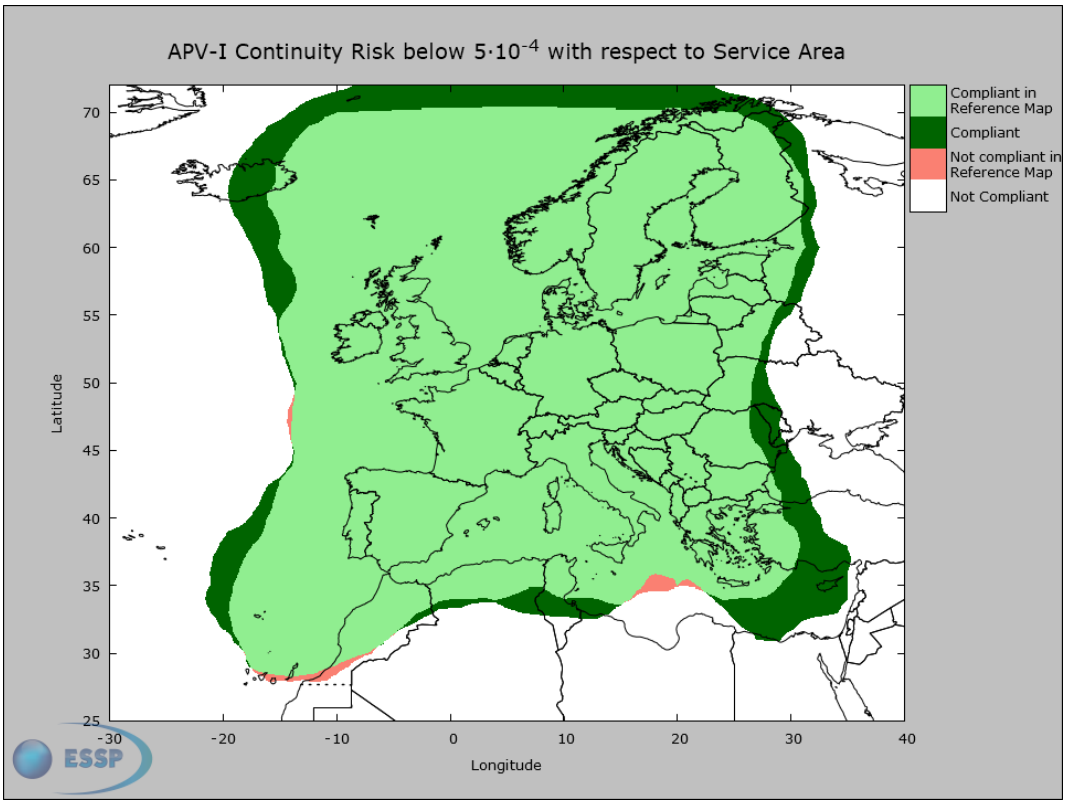


Figure 19: APV-I Continuity Risk ($5{\cdot}10^{-4}$) map regarding the $5{\cdot}10^{-4}$ APV-I Service Area[5] – from 01/04/21 to 31/03/22

In the picture, the legend should be read as follows:

- **Compliant in Reference Map**: The part of the Service Area[5] where APV-I continuity was above $5{\cdot}10^{-4}$.
- **Compliant**: The zone out of the Service Area[5] where APV-I continuity was also above $5{\cdot}10^{-4}$ (coverage extension regarding the commitment).
- **Not compliant in Reference Map**: The part of the Service Area[5] where APV-I continuity was lower than $5{\cdot}10^{-4}$.
- **Not compliant (white)**: Any other zone out of the Service Area[5] where APV-I continuity is lower than $5{\cdot}10^{-4}$.

Using the SDD v3.4 map as the reference, the percentage of points compliant with the $5{\cdot}10^{-4}$ APV-I Service Area ($5{\cdot}10^{-4}$/15sec) is **99.28%**. Note that the comparison regarding the SDD SoL commitment map is included for information purposes. The commitment map is a monthly reference, while the reported period is one year. This comparison must be interpreted with care.

3.4 SoL Service – EGNOS Localizer Performance with Vertical guidance to a decision altitude of 200 FT (LPV-200)

The following figures show the minimum performance expected from EGNOS for LPV-200 availability and continuity, as defined in the EGNOS SoL Service Definition Document. Version v3.4 of the SoL SDD was published on 04/05/2021. Nevertheless, the commitment area of the performance maps was not updated from the preceding version.

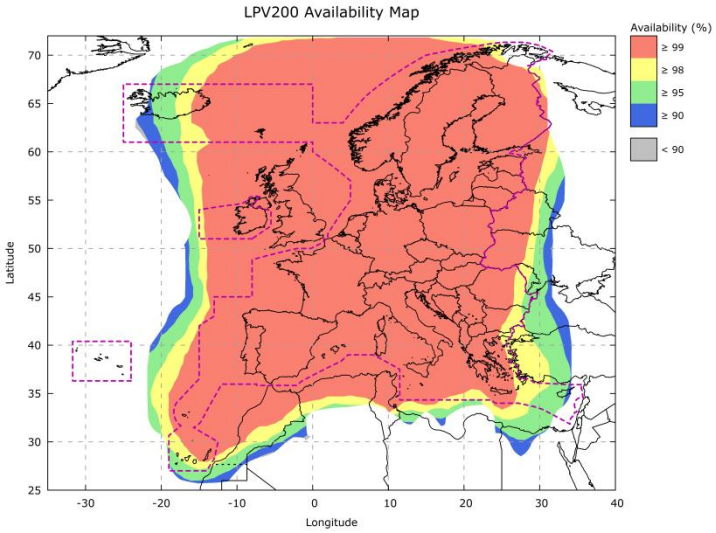


Figure 20: LPV200 Availability map- Expected minimum performance (SoL SDD v3.4)

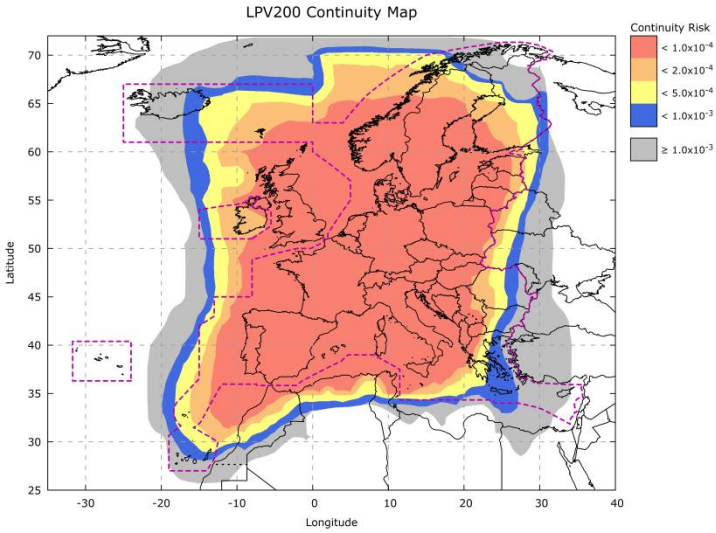


Figure 21: LPV200 Continuity map - Expected minimum performance (SoL SDD v3.4)

These values correspond to the expected performance measured by a fault-free receiver using all GPS satellites in view over one month and all operational EGNOS GEOs.

The LPV-200 performance achieved during the reporting period is conveyed below. Additionally, LPV-200 performance is reported through the EGNOS Monthly Performance reports, available on the EGNOS User Support website.

3.4.1 LPV-200 availability

EGNOS LPV-200 Availability *is defined as the percentage of epochs in the period in which the Protection Level (both HPL and VPL) is below Alert Limits for this LPV-200 service (HAL: 40m; VAL: 35m) over the total period.*

The following figure shows the LPV-200 availability for the combination of the operational GEOs for the period from April 2021 to March 2022:

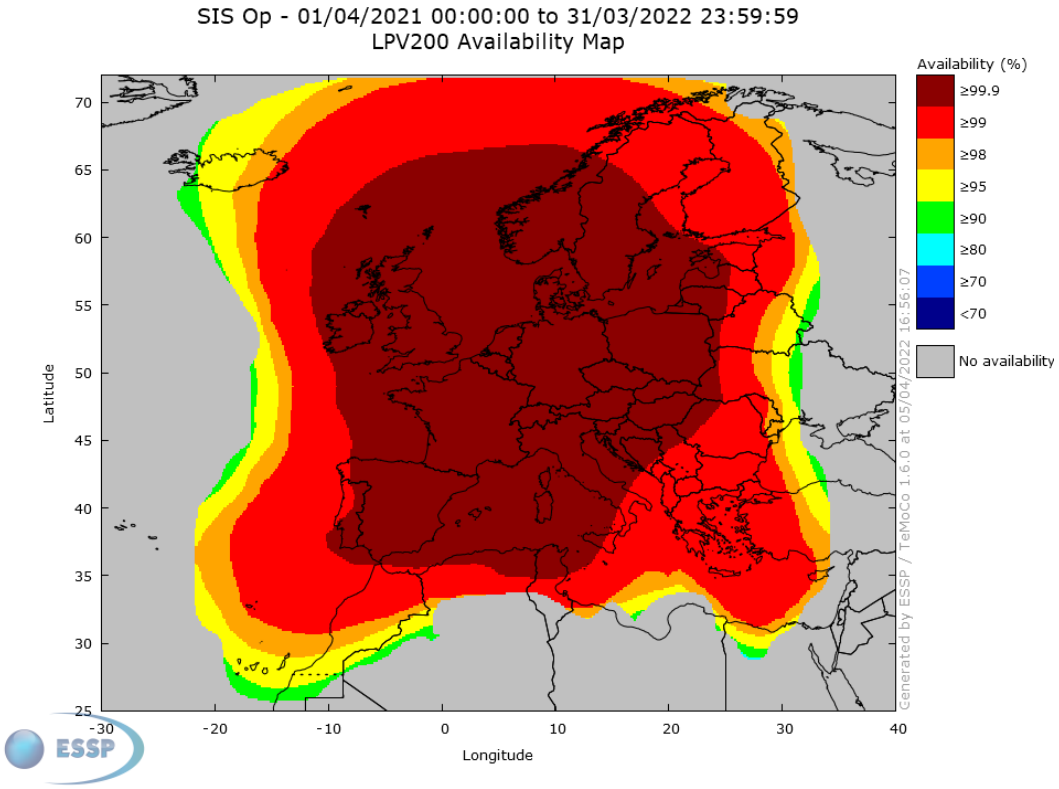


Figure 22: LPV-200 Availability from 01/04/21 to 31/03/22

The LPV-200 availability performance over the Service Area was good during the reporting period: greater than 99% over the entire LPV-200 99% Service Area[6] except for Canary Islands and some areas on the border.

[6] 99% LPV-200 Service Area is the 99% LPV-200 availability area shown in **Error! Reference source not found.** obtained from the EGNOS Safety of Life SDD v3.4.

The following figure shows the annual LPV-200 availability compliance concerning the target at airports with published EGNOS-based operations:

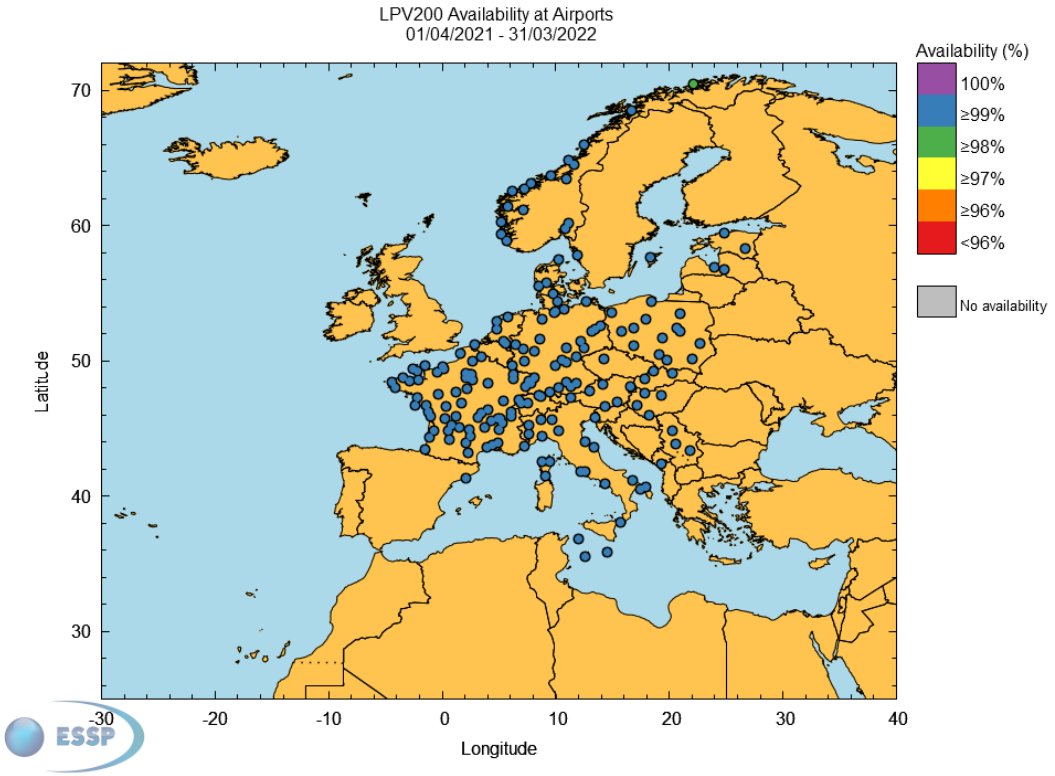


Figure 23: Annual LPV-200 Availability compliance at airports with published EGNOS-based operations

Moreover, the SoL SDD v3.4 commitment was met monthly for the LPV200 service availability during the entire reporting period at all airports with the EGNOS-based operations, apart from:

- Hasvik (ENHK) Airport (Norway) from November 2021 to March 2022.
- Harstad/Narvik/Evenes (ENEV) Airport (Norway) in December 2021.

For additional information, please refer to the corresponding Monthly Performance Reports.

Figure 24: Norwegian National Police Air Support Unit, an EGNOS user (credits: Norwegian National Police)

3.4.2 LPV-200 availability – Achievement against target

The following figure shows the combination of the 99% LPV-200 Availability map and the 99% LPV-200 Service Area[6]:

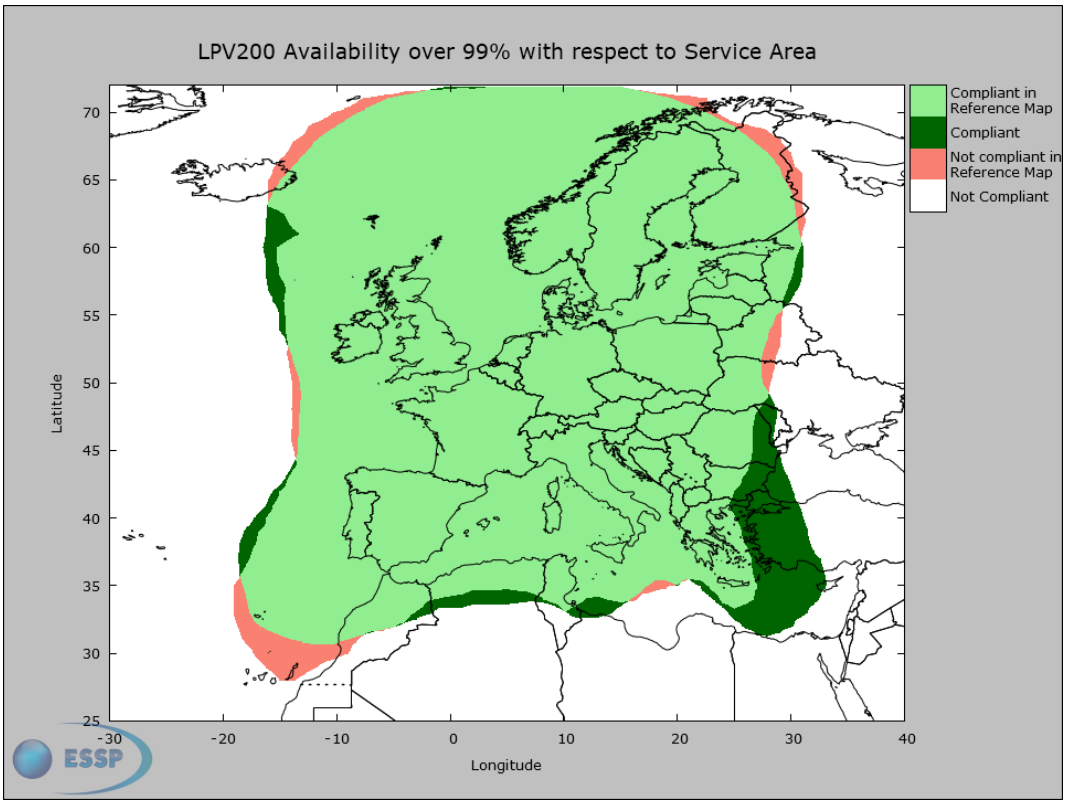


Figure 25: LPV-200 Availability map regarding the Service Area[6] – from 01/04/21 to 31/03/22

In the picture, the legend should be read as follows:

- **Compliant in Reference Map**: The part of the Service Area[6] where LPV-200 availability was above 99%.
- **Compliant**: The zone out of the Service Area[6] where LPV-200 availability was also above 99% (coverage extension regarding the commitment).
- **Not compliant in Reference Map**: The part of the Service Area[6] where LPV-200 availability was lower than 99%.
- **Not compliant (white)**: Any other zone out of the Service Area[6] where LPV-200 availability is lower than 99%.

Considering the EGNOS Safety of Life SDD v3.4 map as the reference, the percentage of compliant points with the 99% LPV-200 Service Area[6] is **95.44%**. Some areas in the northeast, northwest, southeast, east, west, and, mainly, southwest deviated from the SDD commitment for similar reasons to the ones explained in section 3.3.2.

Note that the comparison regarding the SDD SoL commitment map is included for information purposes. The commitment map is a monthly reference while the reported period is one year; therefore, this comparison must be interpreted with care.

3.4.3 LPV-200 Integrity events

EGNOS LPV-200 Integrity Event *is defined as an event in which the Navigation System Error is greater than or equal to the corresponding Protection Level for LPV-200.*

No integrity events were detected.

The ***Safety Index*** *is defined as the Navigation System Error versus the Protection Level ratio (assuming PA algorithms to compute xNSE and xPL) for each second. If the xPE/xPL ratio is over 1, it indicates that a Misleading Information situation has occurred.*

Table 5 shows the maximum HSI and VSI at each RIMS inside the LPV-200 Service Area (see Figure 20 and Figure 21). Moreover, Stanford plots are available on the operations website (http://egnos-user-support.essp-sas.eu/egnos_ops/index.php).

Station	HSI	VSI	Station	HSI	VSI
Agadir	0.28	0.31	La Palma	0.27	0.23
Aalborg	0.28	0.30	Lisbon	0.31	0.24
Alexandria	0.24	0.23	Madeira	0.27	0.23
Athens	0.20	0.20	Malaga	0.28	0.23
Berlin	0.21	0.27	Palma de Mallorca	0.32	0.27
Canary Island	0.29	0.24	Reykjavik	0.21	0.23
Cork	0.24	0.24	Roma	0.25	0.25
Catania	0.21	0.24	S. de Compostela	0.28	0.33
Djerba	0.33	0.24	Sofia	0.26	0.33
Egilsstadir	0.21	0.28	Swanwick	0.28	0.26
Glasgow	0.24	0.27	Toulouse	0.21	0.22
Golbasi	0.18	0.20	Trondheim	0.24	0.26
Gävle	0.24	0.29	Tromsoe	0.27	0.38
Jan Mayen	0.26	0.31	Warsaw	0.21	0.24
Lappeenranta	0.20	0.25	Zürich	0.21	0.23

Table 5: EGNOS LPV-200 Safety Index (maximum) at reference stations

The following figures show the HSI (Horizontal Safety Index) and the VSI (Vertical Safety Index) histograms for each second when collecting measurements from the different EGNOS stations and for both operational GEOs over the reported period.

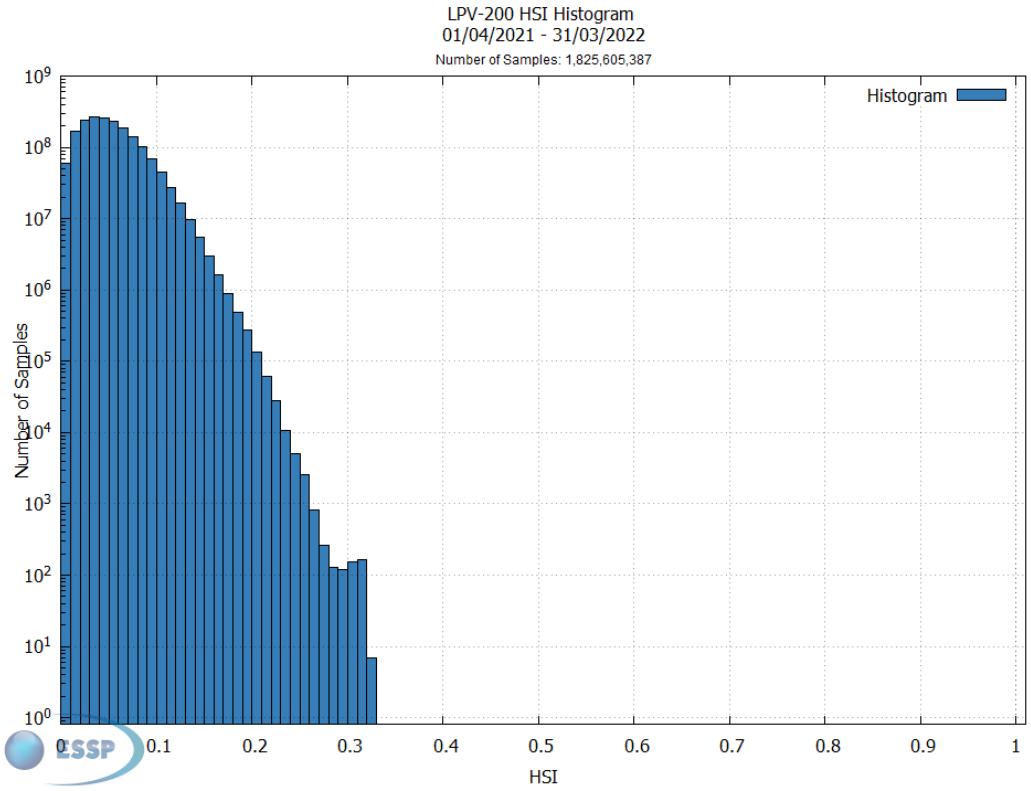


Figure 26: EGNOS LPV-200 Horizontal Safety Index

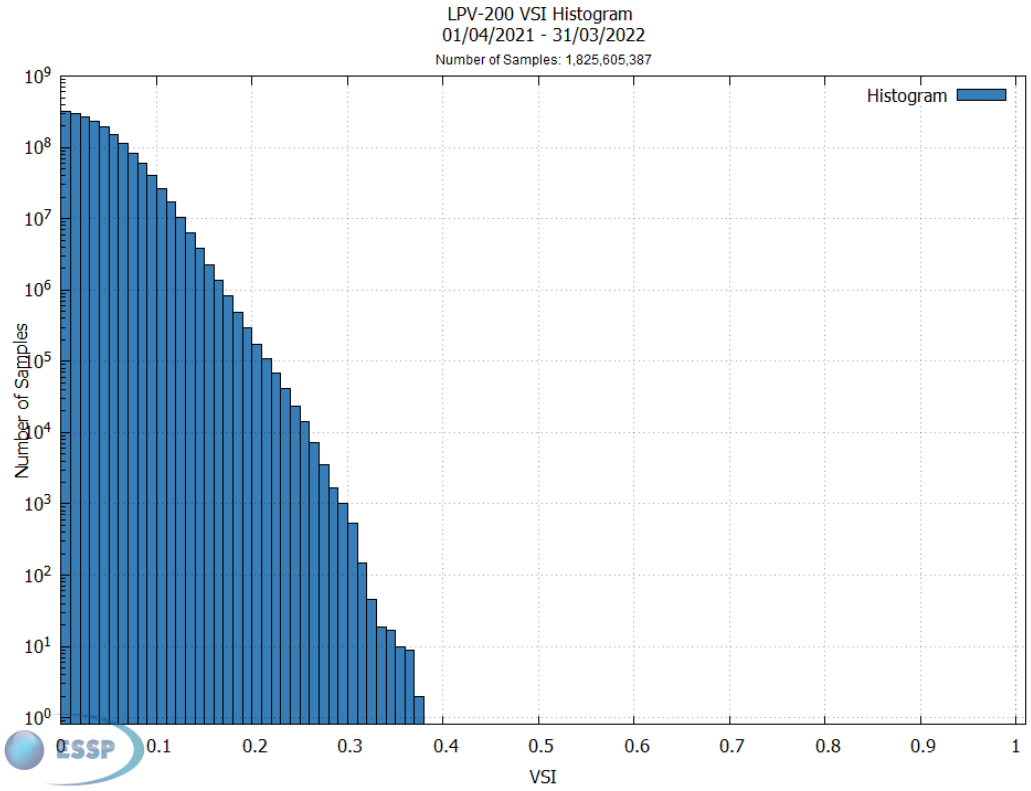


Figure 27: EGNOS LPV-200 Vertical Safety Index

The above figures show that the horizontal and vertical safety index for LPV-200 remained below 0.33 and 0.38, respectively, for all stations, representing a particularly good safety margin.

3.4.4 LPV-200 Continuity risk

EGNOS LPV-200 Continuity Risk *is defined as the result of dividing the total number of single continuity events, using a time-sliding window of 15 seconds, by the number of samples with a valid and available LPV-200 navigation solution. A single continuity event occurs if the system is available at the start of the operation and becomes unavailable in at least one of the following 15 seconds.*

The following figure shows the GEO combined LPV-200 continuity risk for the reported period:

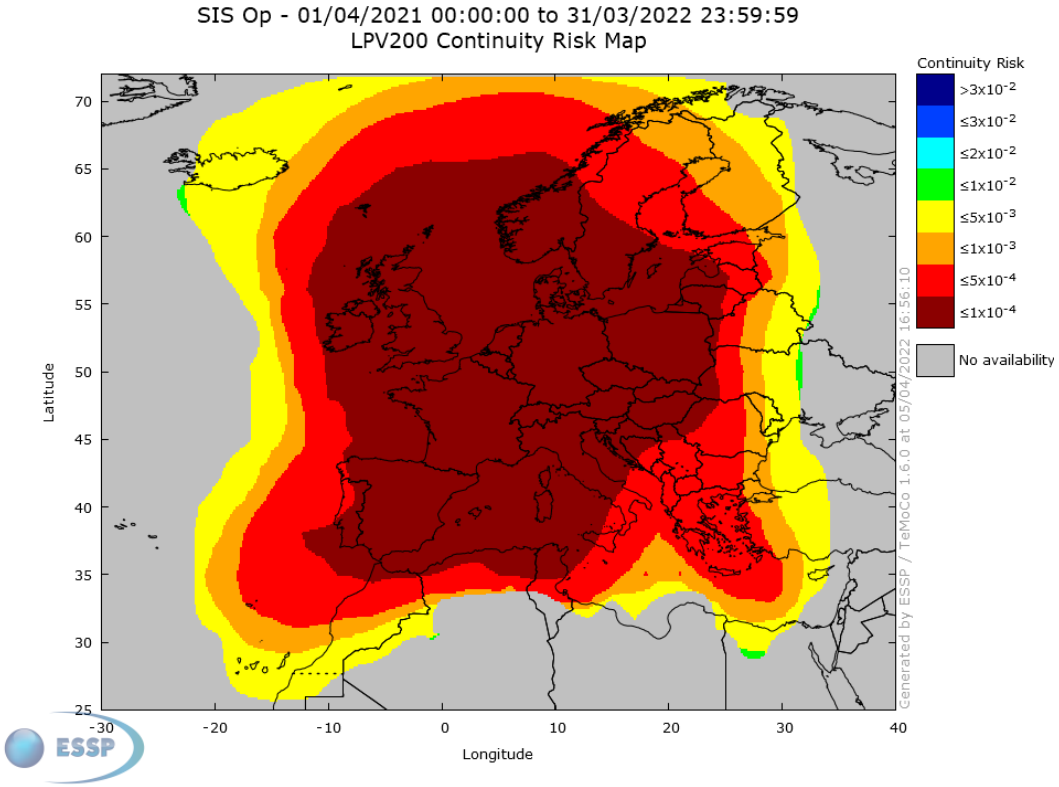


Figure 28: LPV-200 Continuity Risk from 01/04/21 to 31/03/22[7]

The LPV200 continuity performance was good during the reporting period: almost the entire LPV200 $5{\cdot}10^{-4}$ Service Area[8] is covered except for some border areas, mainly over the east/northeast, southwest, northwest and southeast.

[7] The grey colour identifies regions outside the LPV-200 Service area as defined in the EGNOS Safety of Life SDD v3.4.

[8] $5{\cdot}10^{-4}$ LPV200 Service Area is the $5{\cdot}10^{-4}$ LPV200 continuity risk area shown in **Error! Reference source not found.** obtained from the EGNOS Safety of Life SDD v3.4.

3.4.5 LPV-200 Continuity – Achievement against target

The following figure shows the combination of the 5.10^{-4} LPV-200 Continuity Risk map and the Service Area[8]:

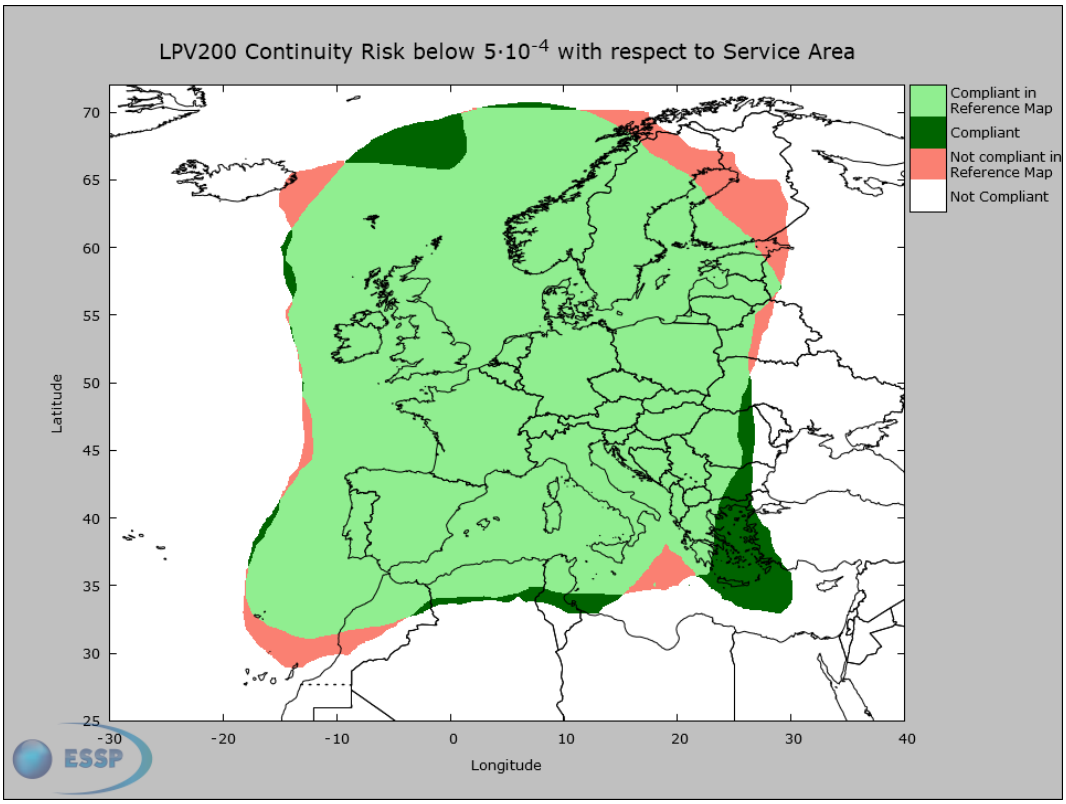


Figure 29: LPV-200 Continuity Risk ($5{\cdot}10^{-4}$) map regarding the reference map – from 01/04/21 to 31/03/22

In the picture, the legend should be read as follows:

- **Compliant in Reference Map**: The part of the Service Area[8] where LPV-200 continuity was above $5{\cdot}10^{-4}$.
- **Compliant**: The zone out of the Service Area[8] where LPV-200 continuity was also above $5{\cdot}10^{-4}$ (coverage extension regarding the commitment).
- **Not compliant in Reference Map**: The part of the Service Area[8] where LPV-200 continuity was lower than $5{\cdot}10^{-4}$.
- **Not compliant (white)**: Any other zone out of the Service Area[8] where LPV-200 continuity is lower than $5{\cdot}10^{-4}$.

Considering the SDD v3.4 map used as the reference, the percentage of compliant points with the $5{\cdot}10^{-4}$ LPV-200 Service Area (5.10^{-4}/15sec) is **91.36%**. Note that the comparison regarding the SDD SoL commitment map is included for information purposes. The commitment map is a monthly reference while the reported period is one year; therefore, this comparison must be interpreted with care.

3.4.6 EGNOS LPV-200 vertical accuracy

When compared to APV-I, LPV-200 is based on more stringent performance requirements, such as a Vertical Navigation System Error (VNSE) of 4 m (95%) and a Vertical Alert Limit (VAL) of 35 m. In addition, specific requirements are defined in terms of the probability the VNSE exceeds 10 m in nominal system operation conditions, set to 10^{-7}/per approach, or 15 m in degraded system operation conditions, defined as a 10^{-5}/per approach.

An Accuracy Major Event (AME) occurs whenever the instantaneous VNSE exceeds 10 m in nominal conditions or 15 m under degraded scenarios.

The following figures show the histogram and cumulative distribution function of VNSE, computed at the RIMS stations inside the LPV-200 Service Area for each second over the entire period.

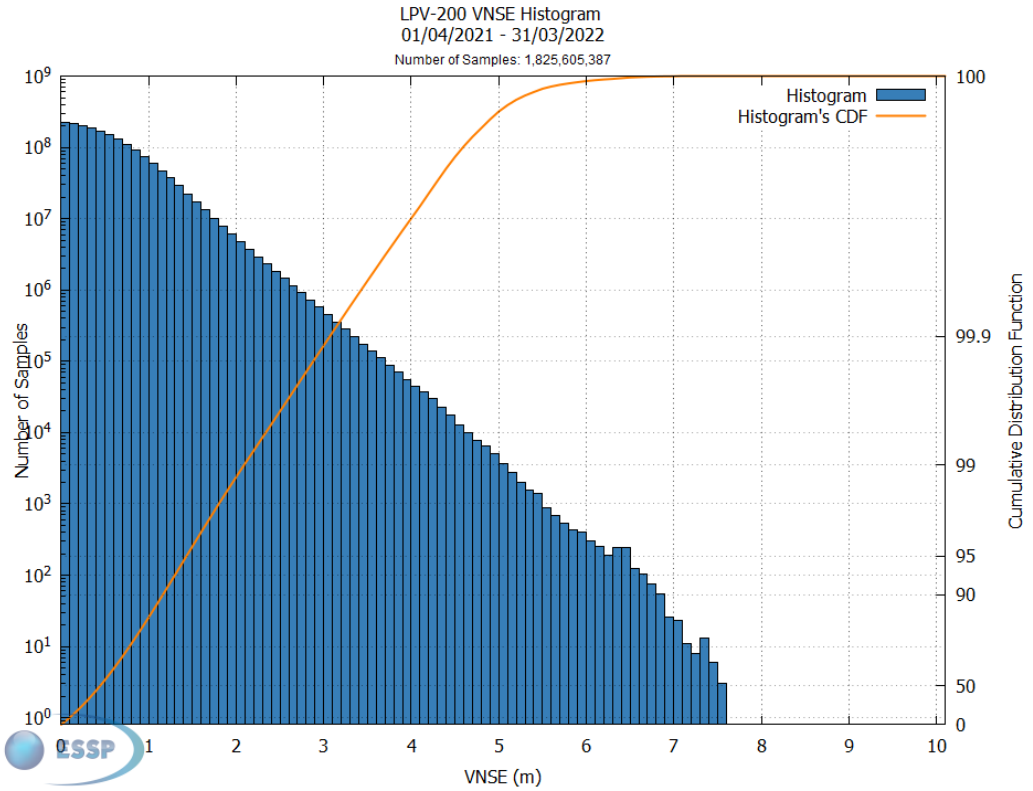


Figure 30: EGNOS LPV-200 Vertical Accuracy Histogram and Cumulative Probability

As observed, the cumulative results confirm that the vertical accuracy remained below 10 metres during the period analysed. In other words, no AME took place during this period. The 95th percentile is below 1.5 metres. The worst accuracy measured in any of the stations was lower than 7.6 metres.

3.4.7 EGNOS LPV-200 accuracy extrapolated at 10-7/150 s

This section presents the results of extrapolating the accuracy results for every station to 10^{-7}/150 s. This extrapolation enables characterising the accuracy distribution tails through a Gaussian extrapolation applied to the vertical navigation error[9].

The following results present the values obtained from 1 January 2021 to 31 December 2021, using values obtained from both operational GEOs. For this period, all RIMS within the LPV-200 Service Area exhibit extrapolated accuracy values within the requirement: Pr (VNSE>10 m) < 10^{-7}/150 s.

[9] An over-bounding Gaussian distribution is computed (σbound) using the cumulative VNSE distribution, which enables obtaining the VNSE bound extrapolated to the required probability of 10^{-7}/150 s. For additional details on the method used, please refer to "SBAS CAT-I available in Europe: LPV-200 commitment area and performance results" [ESSP SAS, ENC GNSS 2016].

For the period of analysis, the accuracy tail extrapolated at 10^{-7}/150 s values for the RIMS within the LPV-200 commitment are:

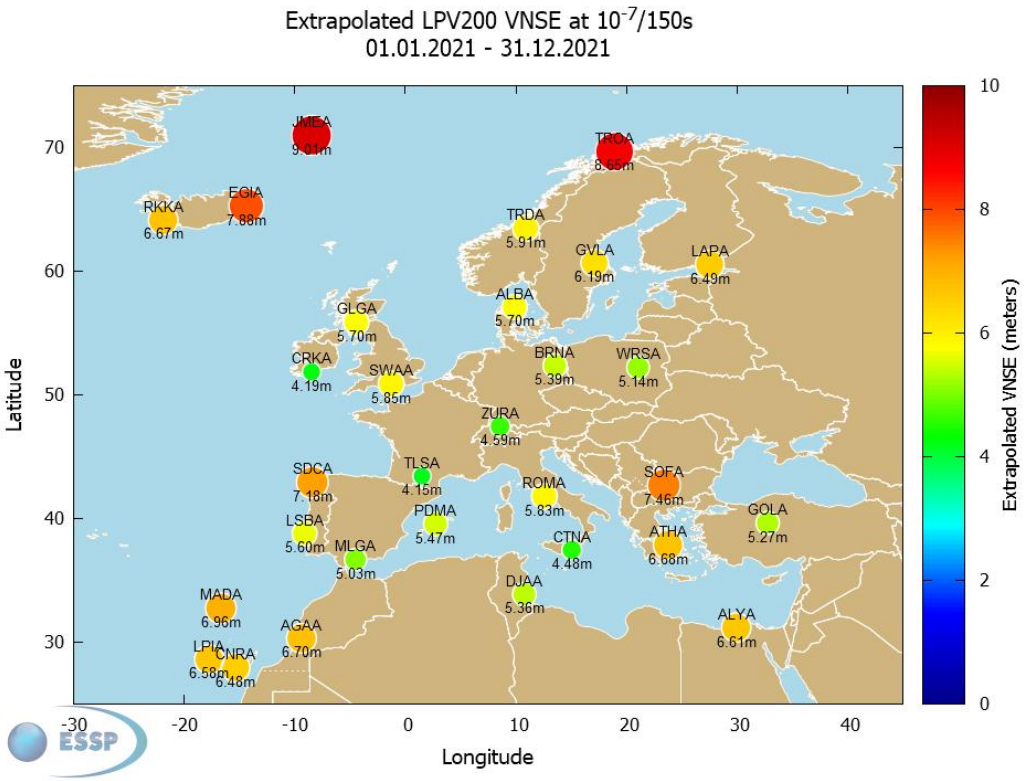


Figure 31: Extrapolated VNSE at 10-7/150 s in the RIMS within the LPV-200 commitment

The highest value is 9.01 m, obtained for RIMS Jan Mayen, which still complies with the requirement.

3.5 Open Service (OS)

The EGNOS OS is qualified by defining the minimum compliance area where 99% of the time, users can calculate their position and the accuracy performance is better than three metres horizontally and four metres vertically. The following figure shows the minimum compliance area:

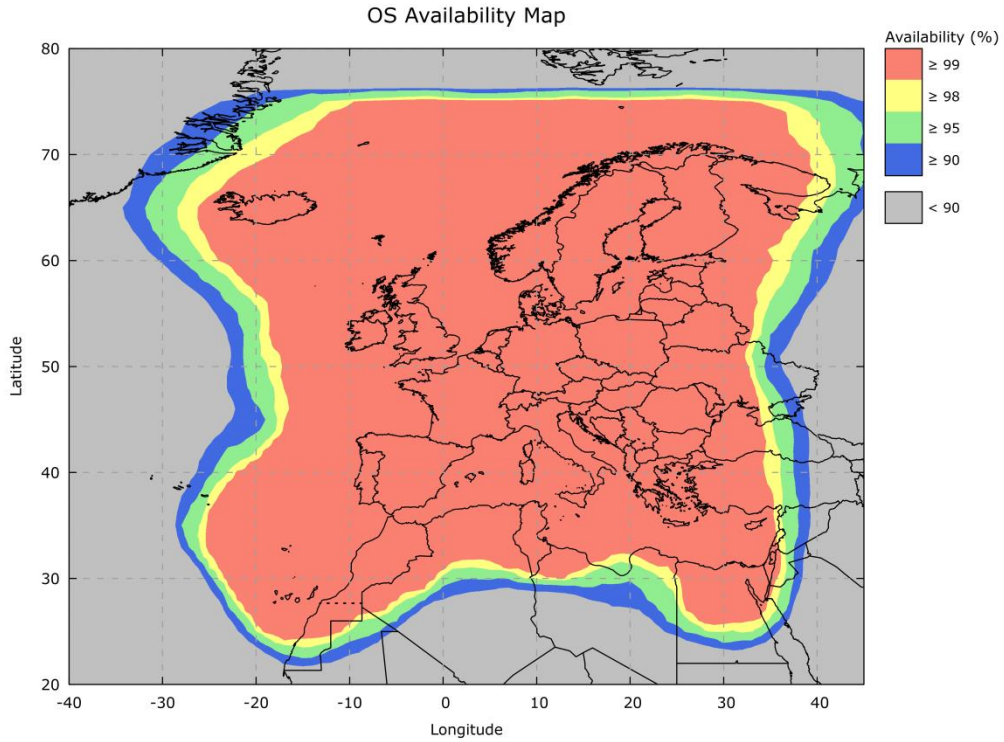


Figure 32: EGNOS OS compliance area

Further details can be found in the EGNOS OS Service Definition Document version v2.3. Additionally, OS performance is reported through the EGNOS Monthly Performance reports, available on the EGNOS User Support website.

3.5.1 RIMS monitoring network

The following map shows the location of the deployed RIMS:

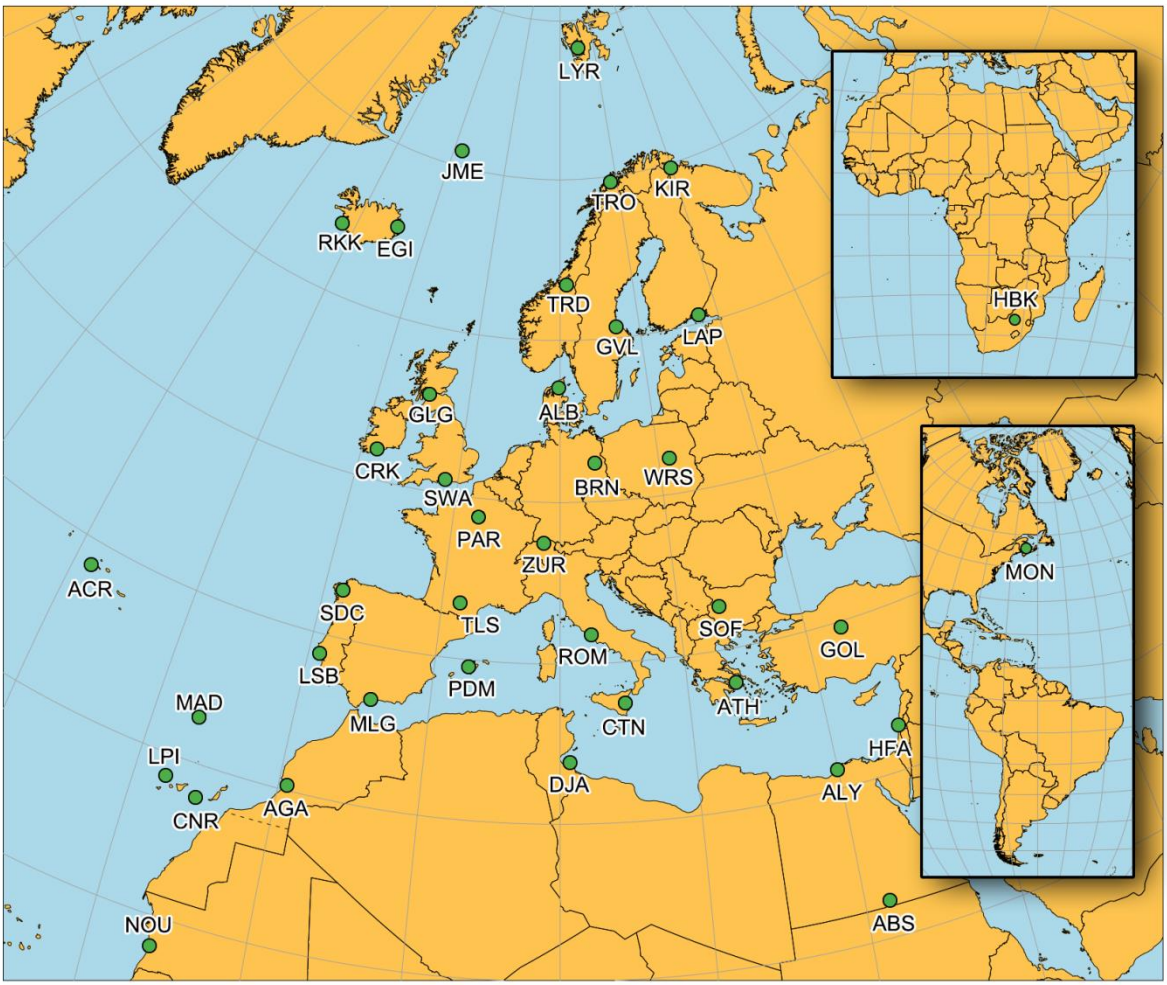


Figure 33: RIMS locations

The receiver network used to report the Open Service corresponds to the subset of RIMS inside the EGNOS OS SDD commitment map.

ID	Location name	Country	ID	Location name	Country
AGA	Agadir	Morocco	LAP	Lappeenranta	Finland
ALB	Aalborg	Denmark	LPI	La Palma	Spain
ALY	Alexandria	Egypt	LSB	Lisbon	Portugal
ATH	Athens	Greece	MAD	Madeira	Portugal
BRN	Berlin	Germany	MLG	Malaga	Spain
CNR	Canary Islands	Spain	PDM	Palma de Mallorca	Spain
CRK	Cork	Ireland	RKK	Reykjavik	Iceland
CTN	Catania	Italy	ROM	Rome	Italy
DJA	Djerba	Tunisia	SDC	S. de Compostela	Spain
EGI	Egilsstadir	Iceland	SOF	Sofia	Bulgaria
GLG	Glasgow	United Kingdom	SWA	Swanwick	United Kingdom
GOL	Golbasi	Turkey	TLS	Toulouse	France
GVL	Gävle	Sweden	TRD	Trondheim	Norway
HFA	Haifa	Israel	TRO	Tromsoe	Norway
JME	Jan Mayen	Norway	WRS	Warsaw	Poland
KIR	Kirkenes	Norway	ZUR	Zürich	Switzerland

Table 6: List of RIMS sites where OS performance is reported

Figure 34: RIMS Station in Egilsstadir (Iceland)

3.5.2 Horizontal and Vertical Accuracy

EGNOS OS Horizontal (resp Vertical) Accuracy *is reported as the 95th percentile of the Horizontal (resp Vertical) Navigation System Error (HNSE/VNSE) over the period, at the monitored sites, when applying EGNOS messages.*

The following table provides the accuracy values (95%) in metres measured for the reported period.

Station	HNSE 95% (metres)	VNSE 95% (metres)	Station	HNSE 95% (metres)	VNSE 95% (metres)
Agadir	1.20	1.50	Lappeenranta	0.80	1.60
Aalborg	0.80	1.50	La Palma	1.40	1.70
Alexandria	1.20	1.60	Lisbon	1.00	1.40
Athens	0.80	1.20	Madeira	0.90	1.20
Berlin	0.90	1.30	Malaga	0.90	1.10
Canary Islands	1.70	1.70	Palma de Mallorca	0.70	0.90
Cork	1.00	1.30	Reykjavik	1.00	2.00
Catania	0.80	1.00	Roma	0.80	1.20
Djerba	1.00	1.20	S. de Compostela	0.90	1.00
Egilsstadir	0.70	1.70	Sofia	1.20	1.70
Glasgow	1.00	1.40	Swanwick	1.10	1.60
Golbasi	0.90	1.30	Toulouse	0.90	1.10
Gävle	0.80	1.70	Trondheim	0.70	1.60
Haifa	1.20	1.80	Tromsoe	1.00	2.40
Jan Mayen	1.10	2.20	Warsaw	0.90	1.40
Kirkenes	0.80	1.80	Zürich	0.80	1.30

Table 7: EGNOS Open Service accuracy (95%)

The horizontal accuracy results for all stations remained below 1.8 metres (95%), and the vertical accuracy below 2.5 metres (95%), representing a particularly good accuracy level.

The following figures show the histogram and cumulative distribution function of the HNSE (Horizontal Navigation System Error) and the VNSE (Vertical Navigation System Error), which are computed at the above stations for each second over the entire period across the value range.

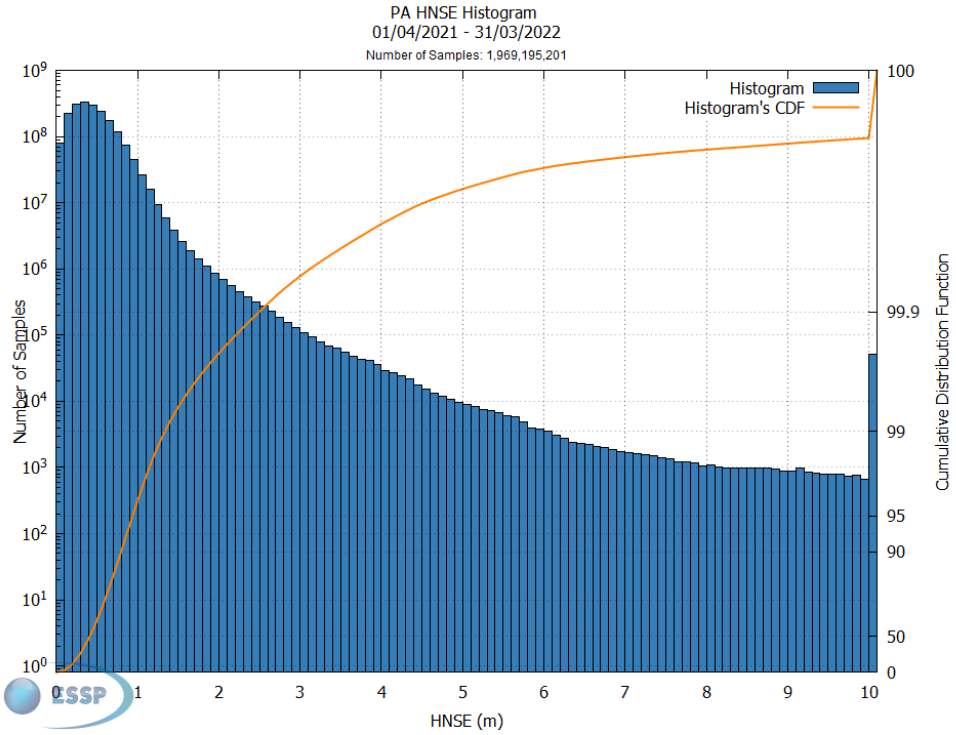


Figure 35: EGNOS Open Service HNSE Histogram and Cumulative Probability[10]

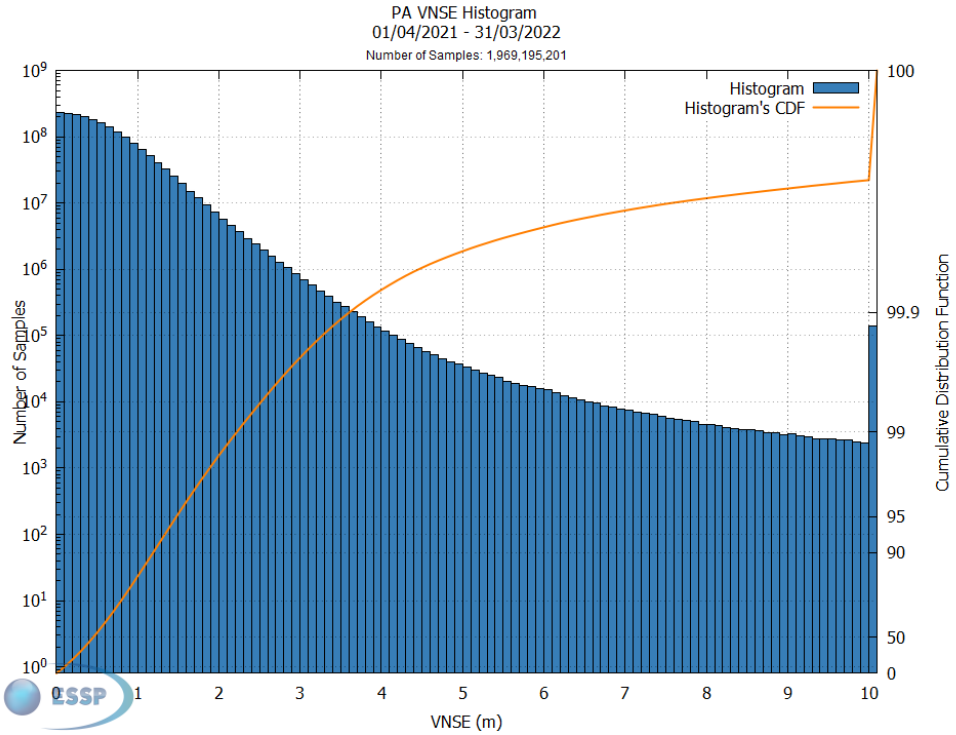


Figure 36: EGNOS Open Service VNSE Histogram and Cumulative Probability[10]

[10] Note that some periods may have been removed for the computation of the different histograms presented in this document, corresponding to stations showing poor quality of data linked to the local environment. Data removed from histograms correspond to data from RIMS where any OR affecting data quality has been observed, or the presence of cycle slips affecting performance is detected, or other data quality issues have been traced as a cause for daily degradations.

As shown, the cumulative results confirm the positive values observed at all stations. The 95th percentile of the observed accuracy performance is below one metre in the horizontal domain and below 1.5 metres in the vertical domain.

Table 8 and Table 9 provide the daily values of monthly maximum for Horizontal and Vertical Accuracy (95%) while using EGNOS messages broadcast by GEO123 and GEO136.

PRN 123		04/21	05/21	06/21	07/21	08/21	09/21	10/21	11/21	12/21	01/22	02/22	03/22	Average
AGA	HPE	2.04	1.71	1.78	2.84	2.10	2.66	3.41	2.39	1.58	1.89	3.06	3.91	2.45
	VPE	1.90	3.69	1.81	2.38	1.84	2.27	3.82	2.17	1.83	1.98	2.48	3.73	2.49
ALB	HPE	0.72	0.61	0.56	0.62	0.84	0.86	1.02	1.12	1.16	0.99	1.04	0.80	0.86
	VPE	1.72	1.78	1.71	1.80	1.62	1.85	1.73	1.79	1.88	2.32	2.05	2.31	1.88
ALY	HPE	1.51	1.44	1.38	1.40	1.35	1.20	1.17	1.23	1.31	1.99	1.41	1.62	1.42
	VPE	1.73	2.08	2.05	2.25	2.09	2.33	1.62	1.64	1.59	2.75	1.65	3.08	2.07
ATH	HPE	0.91	0.91	0.91	0.97	0.77	0.79	0.90	1.01	0.86	0.92	0.84	0.97	0.90
	VPE	1.41	1.50	1.36	1.68	1.29	1.58	1.34	1.19	1.28	1.41	1.36	1.34	1.40
BRN	HPE	1.11	0.87	0.88	0.83	0.99	0.96	1.05	1.11	1.14	1.04	1.01	0.95	1.00
	VPE	1.46	1.54	1.60	1.38	1.29	1.44	1.58	1.55	1.49	1.64	1.70	1.57	1.52
CNR	HPE	2.86	1.47	1.50	1.21	1.74	2.77	3.95	2.25	2.44	2.93	3.55	4.80	2.62
	VPE	1.80	1.74	1.84	1.98	3.17	2.62	2.24	2.51	2.08	2.18	3.00	3.60	2.40
CRK	HPE	1.07	1.01	1.12	1.05	1.10	1.00	1.08	1.24	1.32	1.16	1.27	1.01	1.12
	VPE	1.52	1.53	1.45	1.30	1.36	1.62	1.57	1.60	1.78	1.74	1.58	1.73	1.57
CTN	HPE	1.02	0.91	0.97	0.91	0.89	0.85	0.92	0.79	0.79	0.79	0.95	1.04	0.90
	VPE	1.20	1.30	1.35	1.42	1.10	1.21	1.35	1.21	1.36	1.23	1.10	1.31	1.26
DJA	HPE	1.20	1.10	1.10	1.11	1.01	1.04	1.54	1.13	1.09	1.04	1.03	1.52	1.16
	VPE	1.25	1.30	1.66	1.75	1.47	1.36	1.80	1.40	1.25	1.51	1.16	1.56	1.46
EGI	HPE	0.79	0.70	0.68	0.66	0.89	0.99	1.17	1.31	1.05	1.17	1.25	1.46	1.01
	VPE	2.48	1.82	1.95	2.16	2.44	2.60	2.67	2.54	2.58	2.66	2.82	2.62	2.45
GLG	HPE	1.07	0.87	0.93	0.99	1.00	1.00	1.08	1.21	1.33	1.13	1.20	1.38	1.10
	VPE	1.69	1.50	1.56	1.51	1.62	1.63	1.78	1.78	1.83	1.93	1.84	1.89	1.71
GOL	HPE	1.15	1.05	1.01	1.11	0.99	0.94	0.96	1.13	1.16	0.98	1.02	1.27	1.06
	VPE	1.65	1.40	1.40	1.48	1.49	1.49	1.65	1.51	1.69	1.54	1.71	1.81	1.57
GVL	HPE	0.67	0.62	0.55	0.60	0.82	0.83	1.03	0.94	1.05	1.02	0.88	1.11	0.84
	VPE	1.97	1.93	1.83	1.91	2.00	2.09	2.21	1.87	2.00	1.93	2.02	2.38	2.01
HFA	HPE	1.25	1.47	1.78	1.49	1.94	1.31	1.30	1.35	1.36	1.44	1.56	1.80	1.50
	VPE	2.00	2.59	2.24	2.47	3.24	2.44	2.78	1.71	1.89	2.32	2.76	3.25	2.47
JME	HPE	1.22	1.17	1.07	1.04	1.16	1.10	1.37	1.58	1.38	1.47	1.47	1.43	1.29
	VPE	3.10	2.57	2.55	2.59	2.95	2.65	2.72	2.95	2.45	2.81	3.24	3.10	2.81
KIR	HPE	0.97	0.79	0.80	0.72	0.89	1.04	1.14	1.80	1.22	1.29	1.88	1.40	1.16
	VPE	3.07	2.18	2.09	2.06	2.11	2.36	2.64	2.96	2.58	2.56	3.30	2.96	2.57
LAP	HPE	0.81	0.74	0.69	0.76	0.91	0.89	1.03	0.91	0.98	1.06	0.97	1.16	0.91
	VPE	2.01	1.98	1.89	1.89	1.99	1.77	2.03	1.90	1.96	1.90	1.99	2.42	1.98
LPI	HPE	2.22	1.21	1.81	1.28	1.80	3.21	3.61	1.90	2.26	3.25	3.55	3.99	2.51
	VPE	1.76	1.81	2.27	2.01	2.32	2.58	2.36	2.57	1.95	2.21	2.80	2.81	2.29
LSB	HPE	1.13	1.27	1.16	1.12	1.07	1.12	1.29	1.19	1.16	1.18	1.14	1.28	1.18
	VPE	1.66	1.61	1.64	1.37	1.50	1.45	1.61	1.52	1.50	1.50	1.56	1.79	1.56
MAD	HPE	1.30	1.11	1.23	0.98	1.23	1.80	1.45	1.16	1.12	2.26	1.20	2.49	1.44
	VPE	1.49	1.19	1.80	1.44	1.62	2.23	1.78	1.52	1.58	1.72	1.62	2.34	1.69
MLG	HPE	1.05	1.13	1.24	1.12	1.05	1.00	1.63	1.04	0.98	0.89	0.96	1.62	1.14
	VPE	1.14	1.23	1.47	1.34	1.31	1.47	1.60	1.42	1.19	1.12	1.15	1.74	1.35
PDM	HPE	0.81	0.96	0.96	0.86	0.83	0.75	1.06	0.77	0.82	0.89	0.79	0.97	0.87
	VPE	0.95	1.36	1.18	1.12	0.95	1.01	1.45	1.25	1.02	1.03	1.38	1.42	1.18
RKK	HPE	1.12	1.26	1.04	1.11	1.24	1.57	1.37	2.06	1.61	1.54	2.01	2.13	1.51
	VPE	3.22	2.23	2.26	2.61	2.95	2.38	2.43	3.78	3.17	2.73	3.26	3.20	2.85
ROM	HPE	0.92	0.87	0.88	0.86	0.83	0.81	0.89	0.96	0.91	0.83	0.91	1.10	0.90
	VPE	1.21	1.43	1.34	1.34	1.24	1.28	1.33	1.37	1.33	1.35	1.33	1.58	1.34
SDC	HPE	2.47	1.80	1.23	1.02	1.09	1.01	1.01	1.00	1.04	0.92	0.96	1.00	1.21
	VPE	3.85	2.82	1.55	1.19	1.17	1.03	1.32	1.19	1.21	1.18	1.27	1.28	1.59
SOF	HPE	1.57	1.35	1.44	1.28	1.23	1.29	1.29	1.45	1.40	1.34	1.39	1.58	1.38
	VPE	1.87	1.83	1.98	1.84	1.82	2.36	1.94	1.86	1.84	1.90	2.08	1.83	1.93
SWA	HPE	1.22	1.11	1.25	1.21	1.24	1.20	1.15	1.30	1.28	1.29	1.38	1.24	1.24
	VPE	1.73	1.60	1.72	1.62	1.60	1.66	1.83	1.59	1.91	2.13	2.08	2.11	1.80
TLS	HPE	0.91	0.90	1.02	0.89	0.97	0.90	0.92	0.96	0.96	0.88	0.89	1.01	0.93
	VPE	1.25	1.51	1.37	1.39	1.19	1.20	1.10	1.23	1.46	1.26	1.48	1.48	1.33
TRD	HPE	0.81	0.60	0.65	0.74	0.77	0.81	0.87	0.81	0.85	0.96	0.90	0.94	0.81
	VPE	2.16	1.69	1.69	1.78	1.68	2.10	2.07	2.01	2.02	1.89	2.19	2.61	1.99
TRO	HPE	1.04	0.96	0.94	0.95	1.07	1.16	1.17	1.77	1.58	1.34	1.53	1.28	1.23
	VPE	3.39	2.29	2.62	2.58	3.04	2.98	2.85	3.35	2.83	2.86	3.09	3.49	2.95
WRS	HPE	1.19	1.04	1.02	0.88	0.96	0.94	1.02	1.24	1.28	1.03	1.00	0.98	1.05
	VPE	1.70	1.48	1.69	1.69	1.63	1.48	1.59	1.59	1.64	1.77	1.95	1.94	1.68
ZUR	HPE	0.97	0.91	1.01	0.90	1.03	0.94	1.01	0.93	0.98	0.96	0.89	1.01	0.96
	VPE	1.44	1.41	1.39	1.51	1.33	1.42	1.51	1.51	1.58	1.58	1.59	1.60	1.49

Table 8: Monthly Horizontal/Vertical Accuracy at RIMS-A sites for GEO123 (in metres)

PRN 136		04/21	05/21	06/21	07/21	08/21	09/21	10/21	11/21	12/21	01/22	02/22	03/22	Average
AGA	HPE	2.05	1.68	1.79	2.84	2.05	2.71	3.36	2.44	1.56	1.87	3.09	3.92	2.45
	VPE	1.85	3.73	1.83	2.36	1.85	2.35	3.78	2.20	1.84	1.98	2.44	3.81	2.50
ALB	HPE	0.73	0.61	0.56	0.62	0.84	0.87	1.01	1.12	1.16	0.97	1.04	0.81	0.86
	VPE	1.70	1.77	1.70	1.82	1.62	1.84	1.73	1.78	1.88	2.14	2.05	2.31	1.86
ALY	HPE	1.49	1.40	1.37	1.41	1.36	1.20	1.17	1.24	1.31	2.09	1.43	1.64	1.43
	VPE	1.74	2.05	2.06	2.21	2.09	2.23	1.65	1.64	1.57	2.93	1.66	3.01	2.07
ATH	HPE	0.92	0.91	0.90	0.96	0.77	0.79	0.89	1.01	0.86	0.93	0.85	0.97	0.90
	VPE	1.41	1.51	1.37	1.70	1.29	1.55	1.38	1.20	1.31	1.37	1.36	1.33	1.40
BRN	HPE	1.12	0.87	0.88	0.83	0.98	0.93	1.06	1.12	1.14	1.04	1.02	0.94	0.99
	VPE	1.46	1.54	1.59	1.38	1.29	1.44	1.56	1.56	1.49	1.65	1.69	1.56	1.52
CNR	HPE	2.85	1.46	1.50	1.24	1.75	2.78	4.00	2.37	2.43	2.88	3.60	4.84	2.64
	VPE	1.82	1.74	1.84	1.98	3.16	2.61	2.21	2.45	2.03	2.18	3.00	3.64	2.39
CRK	HPE	1.08	1.01	1.13	1.06	1.09	1.01	1.08	1.24	1.34	1.18	1.26	1.00	1.12
	VPE	1.51	1.52	1.46	1.30	1.37	1.61	1.57	1.61	1.79	1.76	1.60	1.72	1.57
CTN	HPE	1.00	0.91	0.97	0.91	0.89	0.84	0.92	0.80	0.79	0.79	0.96	1.03	0.90
	VPE	1.19	1.30	1.33	1.43	1.10	1.21	1.37	1.22	1.36	1.23	1.10	1.31	1.26
DJA	HPE	1.17	1.10	1.11	1.11	1.02	1.05	1.53	1.15	1.07	0.99	1.02	1.52	1.15
	VPE	1.25	1.30	1.65	1.74	1.47	1.38	1.77	1.39	1.25	1.49	1.17	1.53	1.45
EGI	HPE	0.79	0.69	0.67	0.66	0.90	0.99	1.17	1.33	1.09	1.18	1.18	1.47	1.01
	VPE	2.49	1.82	1.96	2.16	2.42	2.59	2.56	2.58	2.53	2.67	2.82	2.63	2.44
GLG	HPE	1.04	0.87	0.94	0.99	1.00	1.00	1.09	1.21	1.32	1.15	1.20	1.38	1.10
	VPE	1.70	1.51	1.57	1.51	1.61	1.64	1.80	1.77	1.83	1.94	1.83	1.90	1.72
GOL	HPE	1.15	1.05	1.01	1.12	0.98	0.95	0.96	1.13	1.16	0.98	1.02	1.27	1.07
	VPE	1.62	1.38	1.38	1.51	1.49	1.49	1.63	1.52	1.68	1.68	1.79	1.82	1.58
GVL	HPE	0.67	0.62	0.55	0.60	0.81	0.83	1.04	0.94	1.06	1.02	0.89	1.10	0.84
	VPE	1.97	1.89	1.83	1.90	1.99	2.08	2.18	1.87	2.00	1.91	2.03	2.37	2.00
HFA	HPE	1.25	1.51	1.76	1.50	1.94	1.34	1.30	1.32	1.35	1.45	1.55	1.81	1.51
	VPE	1.98	2.63	2.24	2.45	3.25	2.41	2.82	1.69	1.88	2.31	2.73	3.30	2.47
JME	HPE	1.23	1.18	1.07	1.02	1.17	1.11	1.35	1.59	1.39	1.49	1.52	1.43	1.30
	VPE	3.15	2.60	2.55	2.60	2.94	2.63	2.73	3.01	2.43	2.77	3.41	3.08	2.83
KIR	HPE	0.98	0.77	0.79	0.73	0.89	1.01	1.14	1.79	1.20	1.29	1.91	1.40	1.16
	VPE	3.12	2.14	2.09	2.06	2.13	2.40	2.62	2.98	2.60	2.57	3.31	3.01	2.59
LAP	HPE	0.81	0.73	0.70	0.74	0.91	0.89	1.01	0.92	0.98	1.06	0.99	1.19	0.91
	VPE	2.09	1.95	1.92	1.88	2.00	1.72	1.99	1.91	1.96	1.89	2.01	2.41	1.98
LPI	HPE	2.19	1.23	1.81	1.28	1.78	3.16	3.56	1.93	2.26	3.20	3.54	3.94	2.49
	VPE	1.76	1.83	2.26	2.02	2.31	2.58	2.35	2.49	1.92	2.23	2.79	2.79	2.28
LSB	HPE	1.10	1.28	1.16	1.12	1.07	1.11	1.29	1.20	1.14	1.16	1.14	1.29	1.17
	VPE	1.66	1.60	1.62	1.38	1.51	1.47	1.61	1.53	1.51	1.49	1.56	1.80	1.56
MAD	HPE	1.29	1.12	1.23	0.98	1.22	1.82	1.47	1.17	1.14	2.25	1.22	2.56	1.46
	VPE	1.51	1.20	1.79	1.43	1.63	2.24	1.78	1.51	1.65	1.66	1.60	2.33	1.69
MLG	HPE	1.08	1.15	1.26	1.12	1.05	1.00	1.63	1.04	0.98	0.89	0.94	1.66	1.15
	VPE	1.13	1.21	1.49	1.35	1.30	1.47	1.58	1.44	1.20	1.12	1.16	1.73	1.35
PDM	HPE	0.81	0.96	0.97	0.86	0.83	0.76	1.05	0.77	0.82	0.87	0.79	0.97	0.87
	VPE	0.98	1.35	1.19	1.12	0.95	1.02	1.45	1.24	1.02	1.02	1.39	1.39	1.18
RKK	HPE	1.09	1.28	1.01	1.13	1.22	1.53	1.36	2.05	1.60	1.60	1.94	2.11	1.49
	VPE	3.00	2.32	2.23	2.64	2.88	2.35	2.44	3.79	2.97	2.66	3.16	3.23	2.81
ROM	HPE	0.89	0.87	0.87	0.86	0.83	0.77	0.89	0.96	0.91	0.84	0.89	1.08	0.89
	VPE	1.20	1.44	1.34	1.34	1.24	1.28	1.33	1.35	1.32	1.36	1.33	1.62	1.35
SDC	HPE	2.45	1.80	1.23	1.02	1.09	1.03	1.01	0.99	1.04	0.93	0.96	1.00	1.21
	VPE	3.64	2.82	1.55	1.18	1.18	1.03	1.30	1.19	1.21	1.17	1.27	1.27	1.57
SOF	HPE	1.56	1.36	1.44	1.28	1.24	1.31	1.29	1.45	1.39	1.34	1.38	1.57	1.38
	VPE	1.89	1.80	2.04	1.83	1.80	2.34	1.97	1.84	1.83	1.90	2.08	1.84	1.93
SWA	HPE	1.22	1.11	1.25	1.21	1.24	1.20	1.15	1.30	1.28	1.29	1.40	1.23	1.24
	VPE	1.71	1.60	1.72	1.62	1.62	1.65	1.85	1.58	1.89	2.11	2.08	2.12	1.80
TLS	HPE	0.90	0.90	1.02	0.89	0.98	0.93	0.92	0.96	0.96	0.89	0.87	1.00	0.94
	VPE	1.26	1.52	1.36	1.39	1.19	1.19	1.11	1.23	1.46	1.28	1.45	1.47	1.33
TRD	HPE	0.81	0.60	0.64	0.74	0.77	0.83	0.88	0.80	0.85	0.95	0.89	0.93	0.81
	VPE	2.16	1.67	1.69	1.78	1.69	2.10	2.07	2.03	2.01	1.92	2.19	2.59	1.99
TRO	HPE	1.04	0.96	0.93	0.94	1.08	1.14	1.18	1.72	1.62	1.37	1.52	1.30	1.23
	VPE	3.42	2.29	2.60	2.57	3.02	3.00	2.82	3.38	2.84	2.86	3.08	3.48	2.95
WRS	HPE	1.18	1.04	1.02	0.89	0.96	0.95	1.02	1.24	1.32	1.02	1.00	0.99	1.05
	VPE	1.69	1.47	1.69	1.71	1.63	1.47	1.57	1.59	1.66	1.76	1.96	1.95	1.68
ZUR	HPE	0.96	0.90	0.99	0.90	1.03	0.94	1.01	0.93	0.98	0.96	0.89	1.00	0.96
	VPE	1.43	1.41	1.39	1.51	1.33	1.44	1.51	1.50	1.59	1.59	1.58	1.60	1.49

Table 9: Monthly Horizontal/Vertical Accuracy at RIMS-A sites for GEO136 (in metres)

3.5.3 Open Service Availability

EGNOS OS Availability performance *is defined in this document as the percentage of time in the month when the instantaneous HNSE is lower than three metres and the instantaneous VNSE is lower than four metres over the total number of samples with a valid PA navigation solution.*

The following tables provide the values measured using GEO123 and GEO136, respectively.

PRN 123	04/21	05/21	06/21	07/21	08/21	09/21	10/21	11/21	12/21	01/22	02/22	03/22	Average
AGAA	99.92%	99.89%	99.93%	99.76%	99.95%	99.85%	99.75%	99.94%	99.98%	99.92%	99.42%	97.91%	99.69%
ALBA	100.00%	100.00%	99.99%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	99.91%	100.00%	100.00%	99.99%
ALYA	99.91%	99.94%	99.96%	99.87%	99.98%	99.87%	99.97%	100.00%	99.91%	99.91%	99.99%	99.90%	99.93%
ATHA	100.00%	99.98%	99.95%	100.00%	100.00%	99.99%	100.00%	99.99%	99.98%	99.99%	100.00%	100.00%	99.99%
BRNA	100.00%	100.00%	99.97%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%
CNRA	99.86%	100.00%	99.98%	99.97%	99.96%	99.64%	99.64%	99.67%	99.82%	99.44%	97.68%	96.22%	99.32%
CRKA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CTNA	100.00%	100.00%	99.98%	100.00%	99.99%	99.97%	100.00%	100.00%	99.98%	100.00%	99.99%	100.00%	99.99%
DJAA	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	99.97%	99.99%	100.00%	100.00%	100.00%	99.98%	99.99%
EGIA	99.96%	100.00%	100.00%	99.98%	99.86%	99.82%	99.81%	99.77%	99.91%	99.94%	99.92%	99.96%	99.91%
GLGA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
GOLA	99.98%	99.95%	99.88%	99.90%	100.00%	99.93%	99.99%	99.98%	99.97%	99.97%	99.96%	99.90%	99.95%
GVLA	100.00%	100.00%	99.99%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	99.99%	100.00%	99.98%	99.99%
HFAA	99.98%	99.70%	99.52%	99.52%	99.48%	99.68%	99.76%	99.96%	99.95%	99.91%	99.80%	99.68%	99.75%
JMEA	99.81%	99.92%	99.87%	99.90%	99.83%	99.81%	99.82%	99.77%	99.86%	99.81%	99.65%	99.68%	99.81%
KIRA	99.64%	99.64%	99.77%	99.86%	99.82%	99.82%	99.80%	99.67%	99.78%	99.62%	99.22%	99.30%	99.66%
LAPA	99.95%	99.90%	99.97%	99.98%	100.00%	99.97%	99.98%	99.99%	99.99%	99.92%	99.99%	99.93%	99.96%
LPIA	99.98%	99.94%	99.84%	99.98%	99.93%	99.72%	99.72%	99.79%	99.88%	99.63%	97.87%	96.75%	99.42%
LSBA	99.98%	99.99%	99.98%	100.00%	100.00%	100.00%	100.00%	99.98%	100.00%	99.98%	99.98%	99.99%	99.99%
MADA	100.00%	99.99%	99.81%	100.00%	100.00%	99.95%	99.98%	99.93%	99.99%	99.95%	100.00%	99.80%	99.95%
MLGA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	99.94%	100.00%	100.00%	99.98%	99.98%	99.99%	99.99%
PDMA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.98%	99.98%	100.00%	100.00%
RKKA	99.17%	99.24%	99.02%	99.61%	99.64%	99.51%	99.41%	99.26%	99.60%	99.69%	99.51%	98.85%	99.38%
ROMA	100.00%	100.00%	99.99%	100.00%	100.00%	99.99%	100.00%	99.98%	99.99%	99.99%	100.00%	100.00%	99.99%
SDCA	99.31%	99.58%	99.90%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.97%	99.98%	100.00%	99.90%
SOFA	99.94%	99.97%	99.94%	99.99%	100.00%	99.92%	100.00%	99.98%	99.89%	99.98%	99.98%	99.98%	99.97%
SWAA	99.99%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	99.99%	99.99%	100.00%	100.00%	100.00%	100.00%
TLSA	100.00%	99.99%	99.99%	100.00%	99.98%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
TRDA	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	99.98%	99.99%	99.96%	99.99%	100.00%	99.98%	99.99%
TROA	99.75%	99.98%	99.88%	99.91%	99.80%	99.75%	99.44%	99.44%	99.62%	99.63%	99.69%	99.50%	99.70%
WRSA	99.97%	99.98%	99.99%	100.00%	99.99%	100.00%	100.00%	99.99%	100.00%	100.00%	99.97%	100.00%	99.99%
ZURA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table 10: OS Availability at RIMS-A sites for GEO123

PRN 136	04/21	05/21	06/21	07/21	08/21	09/21	10/21	11/21	12/21	01/22	02/22	03/22	Average
AGAA	99.92%	99.90%	99.93%	99.74%	99.95%	99.82%	99.77%	99.94%	99.97%	99.91%	99.45%	97.90%	99.68%
ALBA	100.00%	100.00%	99.99%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	99.93%	100.00%	100.00%	99.99%
ALYA	99.94%	99.94%	99.97%	99.88%	99.98%	99.88%	99.97%	100.00%	99.92%	99.90%	100.00%	99.90%	99.94%
ATHA	100.00%	99.98%	99.95%	100.00%	100.00%	99.99%	100.00%	99.99%	99.98%	99.99%	100.00%	99.99%	99.99%
BRNA	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	100.00%	99.99%	100.00%	100.00%
CNRA	99.86%	100.00%	99.98%	99.98%	99.96%	99.66%	99.62%	99.66%	99.80%	99.46%	97.74%	96.16%	99.32%
CRKA	100.00%	100.00%	99.99%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
CTNA	100.00%	100.00%	99.98%	100.00%	100.00%	99.96%	100.00%	100.00%	99.97%	100.00%	99.99%	100.00%	99.99%
DJAA	99.99%	100.00%	100.00%	99.99%	100.00%	100.00%	99.97%	99.99%	100.00%	99.99%	100.00%	100.00%	99.99%
EGIA	99.97%	100.00%	100.00%	99.98%	99.86%	99.80%	99.82%	99.79%	99.89%	99.94%	99.94%	99.95%	99.91%
GLGA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
GOLA	99.98%	99.95%	99.87%	99.89%	99.99%	99.92%	99.99%	99.98%	99.97%	99.97%	99.96%	99.90%	99.95%
GVLA	100.00%	100.00%	99.99%	100.00%	100.00%	99.98%	100.00%	100.00%	100.00%	99.99%	99.99%	99.98%	99.99%
HFAA	99.99%	99.69%	99.53%	99.52%	99.46%	99.67%	99.74%	99.96%	99.96%	99.91%	99.80%	99.69%	99.74%
JMEA	99.82%	99.92%	99.87%	99.89%	99.82%	99.80%	99.84%	99.73%	99.85%	99.79%	99.64%	99.68%	99.81%
KIRA	99.66%	99.66%	99.77%	99.87%	99.81%	99.84%	99.79%	99.65%	99.79%	99.63%	99.21%	99.30%	99.66%
LAPA	99.94%	99.90%	99.96%	99.99%	100.00%	99.97%	99.98%	99.99%	99.99%	99.92%	99.98%	99.93%	99.96%
LPIA	99.99%	99.94%	99.82%	99.98%	99.93%	99.73%	99.70%	99.80%	99.86%	99.64%	97.96%	96.75%	99.42%
LSBA	99.98%	99.99%	99.98%	100.00%	100.00%	100.00%	100.00%	99.98%	100.00%	99.97%	99.98%	100.00%	99.99%
MADA	100.00%	99.99%	99.82%	100.00%	100.00%	99.96%	99.98%	99.93%	99.99%	99.95%	100.00%	99.80%	99.95%
MLGA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	99.93%	100.00%	100.00%	99.98%	99.99%	99.99%	99.99%
PDMA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.98%	99.97%	100.00%	100.00%
RKKA	99.14%	99.26%	99.02%	99.63%	99.67%	99.53%	99.38%	99.27%	99.61%	99.68%	99.54%	98.81%	99.38%
ROMA	100.00%	100.00%	99.99%	100.00%	100.00%	99.99%	100.00%	99.98%	99.99%	100.00%	100.00%	100.00%	100.00%
SDCA	99.34%	99.58%	99.89%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.97%	99.98%	100.00%	99.90%
SOFA	99.94%	99.97%	99.94%	99.99%	100.00%	99.91%	100.00%	99.98%	99.89%	99.98%	99.99%	99.98%	99.97%
SWAA	99.99%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	99.99%	99.99%	100.00%	100.00%	100.00%	100.00%
TLSA	100.00%	100.00%	99.99%	100.00%	99.98%	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%
TRDA	100.00%	100.00%	100.00%	100.00%	100.00%	99.99%	99.96%	99.99%	99.96%	99.99%	100.00%	99.98%	99.99%
TROA	99.76%	99.98%	99.88%	99.91%	99.80%	99.75%	99.43%	99.42%	99.63%	99.64%	99.68%	99.49%	99.70%
WRSA	99.98%	99.98%	99.99%	100.00%	99.99%	100.00%	100.00%	99.99%	100.00%	100.00%	99.98%	100.00%	99.99%
ZURA	100.00%	100.00%	99.99%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table 11: OS Availability at RIMS-A sites for GEO136

The monthly Open Service availability performance in all RIMS stations was over 99%, except for RIMS CNRA and LPIA in February and March 2022 and RIMS AGAA and RKKA in February 2022.

The following map shows the OS availability value during the year for each location. The worst value between GEO123 and GEO136 is shown.

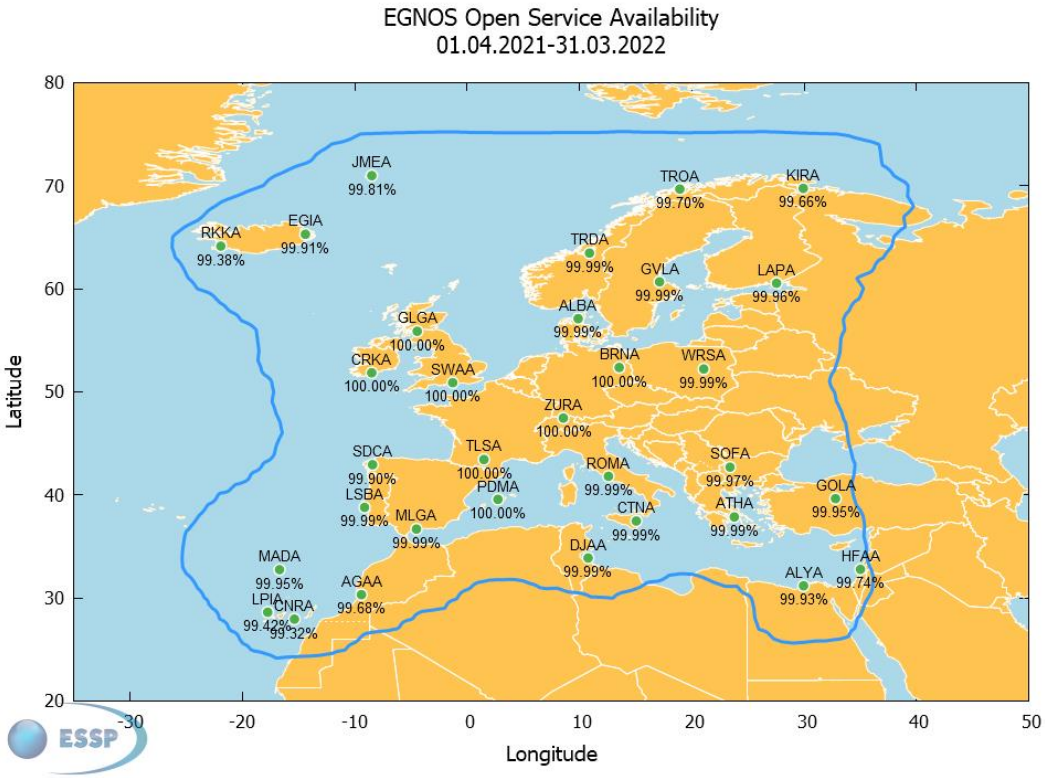


Figure 37: OS availability for the RIMS stations

As shown in the preceding figure, the global Open Service Availability performance has been greater than 99% at all stations.

Figure 38: The University of Lleida measures soil ECa using a device that georeference the measurements using EGNOS (credits: University of LLeida)

3.6 EGNOS Data Access Service (EDAS)

EDAS (EGNOS Data Access Service) provides free-of-charge internet-based access to EGNOS and GNSS (GPS and GLONASS) data in real-time and through an archive, including all data generated by the EGNOS ground stations, mainly distributed over Europe and North Africa.

EDAS, like all other EGNOS Services, has its own EDAS SDD (Service Definition Document). Among other content, the EDAS SDD defines the committed performance for EDAS (which should always be met in a nominal situation) in terms of availability and latency:

- **Availability:** percentage of time in which EDAS is providing its services according to specifications. Availability of EDAS services is measured at the EDAS system output (excluding external network performance).
- **Latency:** time elapsed from the transmission of the last bit of the navigation message from the space segment (the EGNOS and the GPS/GLONASS satellites) until the data leave the EDAS system (formatted according to the corresponding service level specification). The EDAS latency is a one-way parameter defined for real-time services.

Based on the above definitions, the tables below show minimum availability and maximum latency levels for the EDAS services:

SL0	SL2	SISNeT	FTP	Data Filtering	Ntrip
98.5%	98.5%	98%	98%	98%	98%

Table 12: EDAS services minimum availability

SL0	SL2	SISNeT	FTP	Ntrip	Data Filtering	
					SL0	SL2
1.3seconds	1.450 seconds	1.150 seconds	N/A	1.75 seconds	1.6 seconds	1.75 seconds

Table 13: Maximum latency for EDAS Services

The EDAS performance is reported through the EGNOS Monthly Performance reports, available on the EGNOS User Support website.

Figure 37 shows the availability achieved during the last annual period.

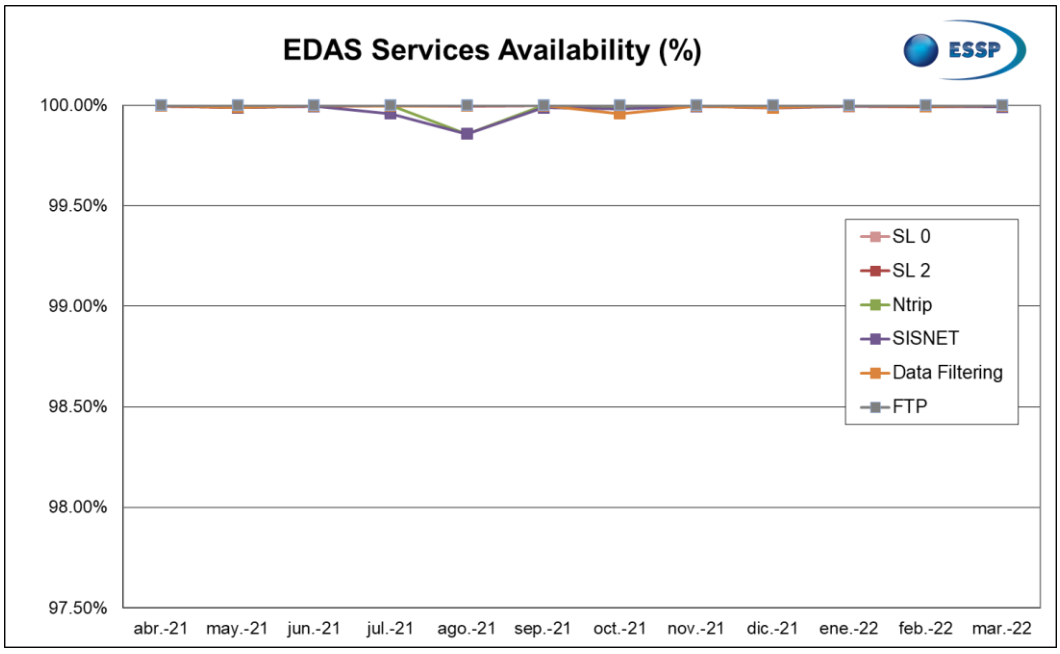


Figure 39: EDAS Services Availability (from April 2021 to March 2022)

As shown above, the EDAS availability has been consistently above 99.9% for all services over the entire reporting period, except in August 2021, when there was a slight degradation (due to unplanned outages that were recovered within the day). Nevertheless, the monthly availability figures remained clearly above the commitments defined in the EDAS SDD.

The latency for real-time services (not applicable for the FTP service) during the previous year period is shown below, computed as the average of the 95th percentile latencies monitored for every five minutes during the year.

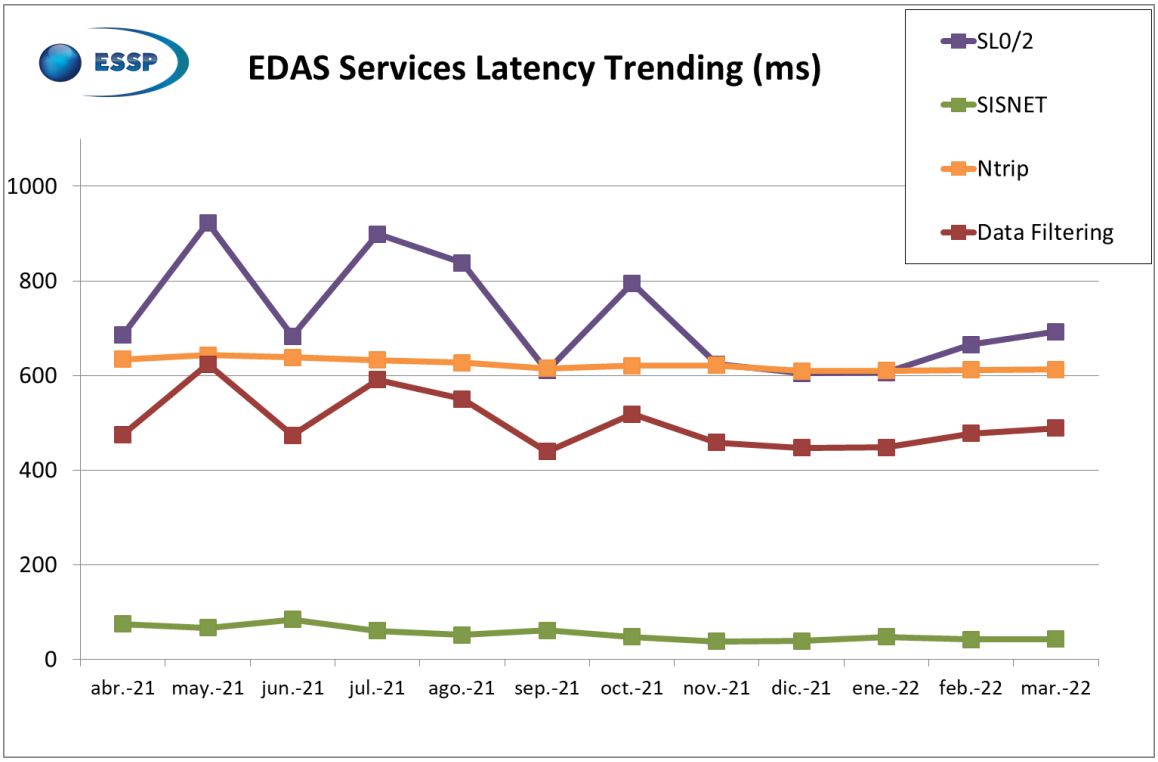


Figure 40: EDAS Services Latency (from April 2021 to March 2022)

As shown in Figure 40, the EDAS services latency has been consistently below the one-second threshold and well below the EDAS SDD commitment for all services over the entire reporting period.

Figure 41: The German DGNSS service uses EGNOS as a local source of GPS corrections (credits: German Federal Waterways and Shipping Administration -WSV)

4 EGNOS SERVICES PROVISION

4.1 SoL Aviation Service Status

Based on the current EGNOS System Release (ESR), version 2.4.2A+ all available Service Levels enable aircraft approaches from NPA to those operationally equivalent to ILS CAT I. APV-I and LPV-200 Service Levels provide lateral and angular vertical guidance without the need for visual contact with the ground until a Decision Height (DH) of 250 ft. and 200 ft., respectively, above the runway threshold. In particular, the EGNOS LPV-200 Service Level-based approaches guarantee the advantages provided by an ILS CAT I approach with the airspace design flexibility of a PBN approach.

The EGNOS SoL Service remained stable and robust during the reported period, only suffering degradations affecting specific airports in *Norway, Finland, Greece, Bulgaria, Italy, Montenegro and Spain*. Such degradations were duly communicated to the concerned organisations with EWA in place, in line with the applicable mechanisms per the established and in-force EGNOS Working Agreements (EWAs). EWAs set forth the operational and legal foundations in formalising working procedures, technical baselines, and required interfaces between ESSP and SES Certified Air Navigation Service Provider (ANSP) or other organisations entitled by the corresponding competent authority willing to use the EGNOS Safety-of-Life Service as a navigation aid. This Agreement is the necessary step before the publication of SBAS-based operations, mandatory for ANSPs.

The SoL Service Definition Document (SDD 3.4), published on 4 May 2021, has been in force for the entire reporting period.

Figure 42: Dassault Aviation relies on EGNOS and LPV (credits: Dassault Aviation)

4.2 Service Definition Documents and Service Notices over the period

The EGNOS Service Definition Documents (SDD) describe the characteristics and conditions for access to each EGNOS service (OS, SoL and EDAS).

At the request of EC, a new intermediate SDD was published following the withdrawal of the United Kingdom from the European Union. This SoL SDD v3.4 was published on 4 May 2021 and includes a new magenta line layout and other topics, such as the non-use of the L5 signal and clarification on introducing new GPS satellites.

In parallel, and continuing the information provided in the SoL Service Implementation Roadmap, a new version of the SDD is being developed for publication to tackle the latest EGNOS programme topics (Iceland is a new EGNOS Participant State, the transition from GSA to EUSPA naming) and the inclusion the updated performances.

As amendments to the EGNOS SDDs, ESSP generates Service Notices whenever there is any complementary information to users that could affect SDD content. Hence, an EGNOS Service Notice is a temporary amendment to the applicable version of the EGNOS Service Definition Documents.

During this reported period, ESSP has not published/updated any Service Notices. However, several drafts and templates were generated, mostly related to anticipating the potential impact that could require communication with the users. For instance, due to potential Brexit conditions, RIMS relocations or other relevant topics for users, which were ultimately not needed.

The current status of the Service Notices is available on the EGNOS User Support website.

4.3 User Consultations and Improvement Actions

4.3.1 2021 EGNOS User Satisfaction Process

Each year, an overall EGNOS User Satisfaction Process is jointly performed by the EUSPA and ESSP on the three EGNOS Services (SoL, OS, and EDAS). The purpose of this process is to receive valuable feedback on the EGNOS use and ESSP's performance, identify improvement areas and define recommendations on the EGNOS services.

This process considers feedback received via different means and interfaces, like the EGNOS Service Provision Workshop, the EGNOS User Support activities, ESSP's participation in multimodal forums, the GNSS implementation projects, and working groups, or relevant events. However, the main input is the user satisfaction survey, which is widely distributed to key users and stakeholders of each EGNOS Service.

The EGNOS User Satisfaction Survey was launched in December 2021 and closed on 05/04/2022, using a specific online platform.

The output from this survey will be included in the EGNOS Bulletin Summer 2022 and published on the EGNOS User Support Website.

4.4 Service Implementation Roadmaps

The EGNOS Services Implementation Roadmaps (SIR) provide a high-level overview of the current status of the EGNOS Services and their expected evolution in a three-year timeframe, associated with the subsequent deployments and information/interfaces improvements/changes of the EGNOS System Releases. These roadmaps mainly focus on four different areas: Service Evolution, Service Area / Service Level (or Data availability in EDAS), Service Robustness, and User Interfaces.

The three roadmaps for the EGNOS Services were updated in July 2021 (v5.0). The currently applicable version is available at:

- EGNOS Open Service Roadmap
- EGNOS Safety of Life Service Roadmap
- EGNOS Data Access Service (EDAS) Roadmap

Several improvements were made to the content and presentation of the SIR in these three documents, mainly to provide the EGNOS users with a more user-friendly, dynamic, and interactive way of obtaining information on the evolution of the EGNOS services. These improvements are included in the last version of the SIRs.

The following figure shows the roadmap as it was last published. It is worth noting that a new updated version will be published in the second quarter of 2022.

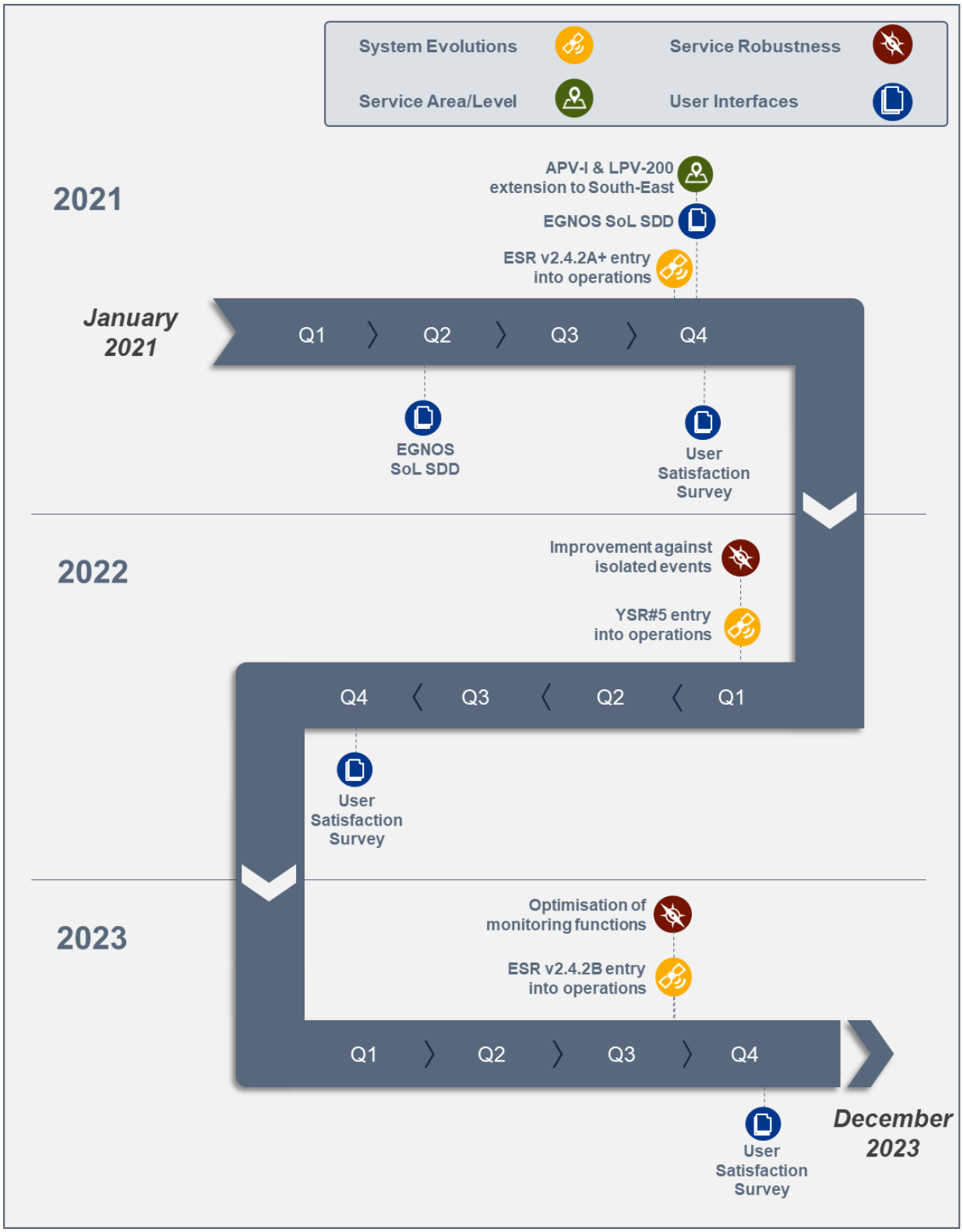


Figure 43: EGNOS SoL Services Roadmap

4.5 2021 EGNOS Multimodal Adoption Plan

The EGNOS adoption activities have proven to be a useful means of enhancing the EGNOS use in aviation, maritime, agriculture, geomatics, and rail market segments. In aviation, ESSP and EUSPA have continued engaging aerodromes to publish the EGNOS-based procedures and operators to get equipped and certified. Additionally, ESSP performed traffic assessments and Cost-Benefit Analyses to support airlines, OEM, and airport decision-making processes regarding the adoption of EGNOS.

During the period reported in this document, 32 LPV, 51 LPV200, 2 LPV200(Hel) and 30 PinS were published, for a total of 115 EGNOS-based procedures in this period.

39 more aircraft/rotorcraft units have been engaged so that in the near future, they will retrofit, start with the certification process, or request SBAS options in the avionics for new unit orders. ESSP has proven to be a key facilitator in promoting, explaining, and connecting potential partners within ANSPs, Avionics Manufacturers, Operators, and Aircraft Manufacturers.

The work carried out in the maritime domain during preceding years continued in 2021:

a) Supporting Croatian maritime and inland waterways authorities by providing technical feasibility analysis and CBAs to retransmit EGNOS corrections through their AIS stations.

b) Further market analysis on SBAS-enabled equipment, portable pilot units, and awareness.

In agriculture and geomatics, the contacts network has increased significantly, particularly in farming. Success stories have been identified in forestry, tractor guidance and agriculture (in combination with Copernicus). A new upgrade of EASE and GEAR tools has been released to inform about savings in carbon emissions when using EGNOS compared to other technologies. In this period, ESSP has also continued preparing customised information for these market sub-segments, including specific workshops and webinars.

Regarding rail activities, ESSP has continued supporting the EUSPA in the market size assessment of European freight wagons envisaged to be equipped with GNSS devices: Nearly 200,000 freight assets are foreseen to be retrofitted by 2022 with EGNSS receivers. By 2021 it was confirmed that 156,000 smart assets in Europe had already been equipped with EGNSS telematics devices. These results were compiled in an informational brochure.

4.6 Communication and EGNOS Promotion Activities

The 10th edition of the EGNOS Workshop was an online event, live-streamed on 2 December 2021.

On the one hand, the workshop was the opportunity to learn more about the evolution of the EGNOS Safety of Life service and its growth in aviation ten years after it entered into force. On the other hand, different presentations and videos were broadcast, focusing on the EGNOS programme's roadmap and EGNOS services' status together with success stories and concrete examples of the benefits that EGNOS offers to European users in fields such as aviation, maritime, rail and agriculture.

The attendees also had the opportunity to interact with all speakers during the questions and answers period, and the EGNOS awards ceremony took place at the end of this virtual EGNOS Workshop 2021.

Further details are included in the EGNOS bulletin spring 2022 edition.

Figure 44: 2021 EGNOS Workshop– Online edition

Speaker presentations and videos are available online on the EGNOS User Support Website (*News and Events → Workshops → Workshop 2021*). Additionally, the answers to all questions received, including those that could not be explained live, are also published there.

5 KEY ACTIVITIES PLANNED FOR THE YEAR AHEAD

5.1 Service Provision and Development

5.1.1 EGNOS Working Agreement implementation in aviation

The EWA template content will evolve in the new version v8.0 to be adapted to the new regulatory elements. The new template is expected to be consolidated with EUSPA and EC during Q2 2022. This template will allow ESSP to start the re-signature process with all EWA signatories.

Additionally, the Working arrangements are expected to evolve and improve to cover users' eventual needs and the applicable EU regulation. The main activities planned regarding the EWA are:

- EWA improvement activities: addressing mainly the improvement in using the Collaborative Decision-Making service arrangement and reinforcing communication with all types of users within the EGNOS Working Agreement framework.
- Continuing the confirmation of the EWA scheme for rotorcraft operators and aerodrome operators, facilitating the implementation of EGNOS-based procedures in scenarios where non-SES certified ANSPs operate, supporting the application of the National Regulations.

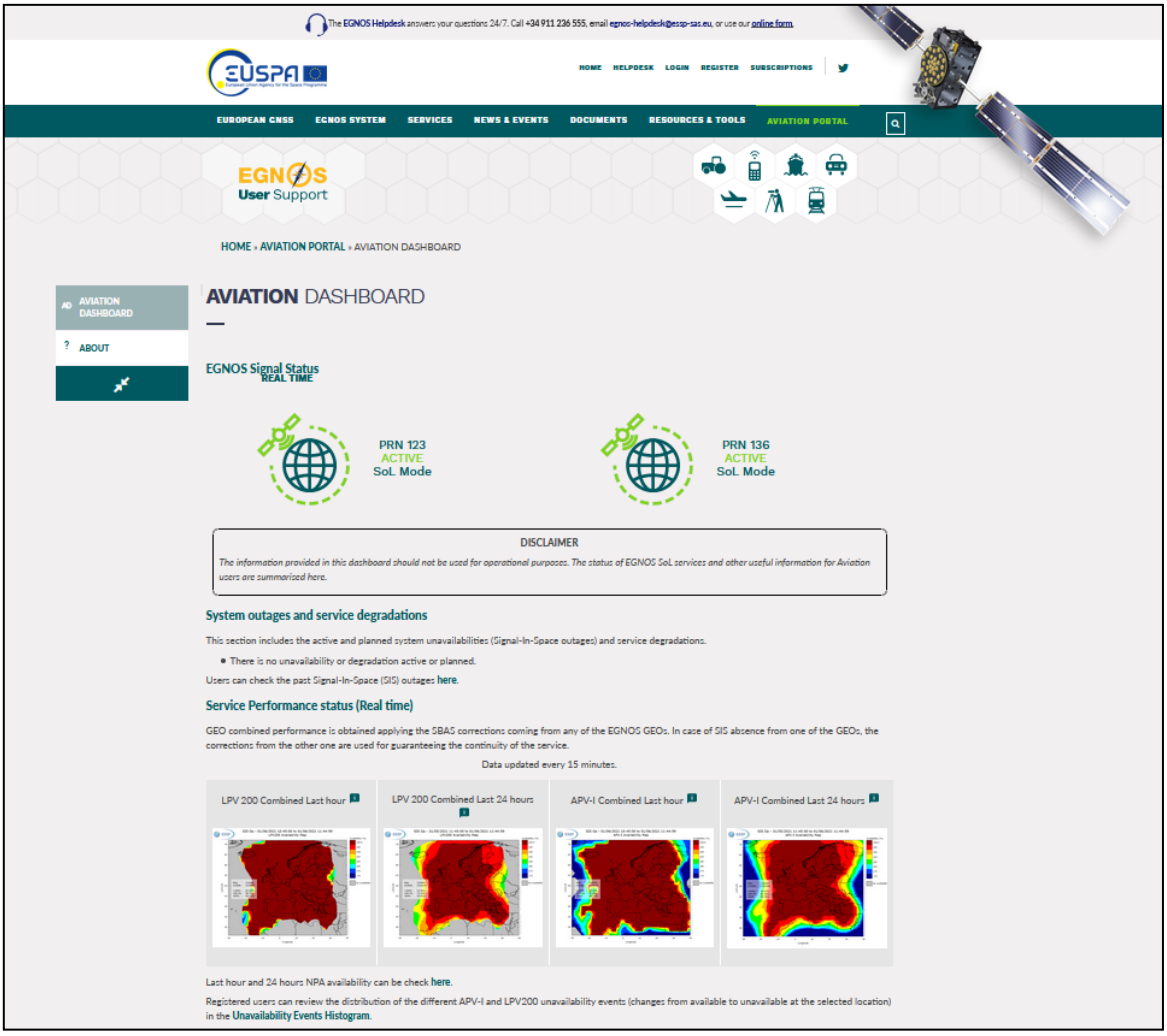


Figure 45: EGNOS aviation dashboard (EGNOS User Support Website)

5.1.2 EGNOS Services' related documents evolutions

EGNOS Service Definition Documents (SDD)

Three Service Definition Documents will be published during the upcoming period:

- A new version of the SoL SDD is expected in the coming months, associated with Iceland as EGNOS member, GSA to EUSPA transition, together with an updated of the commitment maps.
- OS and EDAS SDDs also will be updated in Q2 2022, mainly due to Iceland becoming an EGNOS member, GSA to EUSPA transition, and general service information update.

Service Implementation Roadmaps

The three EGNOS Services Roadmaps will be updated at least twice during the upcoming period.

The following publication is expected in Q2 2022, continuing the new Look and Feel. The main items addressed in the subsequent versions of the Service Roadmaps are:

- The publication of the next possible SDDs.
- Information regarding the upcoming EGNOS releases and their benefits to EGNOS users.

5.1.3 User Services Evolution

The EGNOS User Support is continuously evolving to better support the adoption of the EGNOS and the needs of the different user communities.

The main priorities for the upcoming period are:

- Boost the number of EGNOS User Support Website developments visible by end-users to mitigate the impact of the Drupal migration activities.
- Continue focusing on user care and publishing news articles in coordination with the EUSPA.

5.1.4 2022 EGNOS Multimodal Adoption Action Plan

Each year, the EGNOS Multimodal Adoption (EMA) plan establishes the different activities that should be put in place to leverage the use of EGNOS by all different market segments. These are agreed upon between EUSPA and ESSP at the beginning of the year, and their progress is reviewed on a regular basis. The activities to be developed in 2022 are distributed into several market segments: aviation (where the major effort is placed), maritime, rail, agriculture, transversal and other market segments (energy and raw materials and smart mobility and urban development).

Regarding aviation, the activities focus on active promotion and engagement of aviation stakeholders (aerodromes, ANSPs, and operators) through Traffic Assessments, CBAs and the continuous follow-up of the EGNOS implementation status (this allows updating the LPV procedures map every month in the EGNOS User Support Website). Special focus is placed on the activities associated with quantifying how EGNOS is supporting greener aviation through CO2 reduction, complemented by the identification of real showcases and the environmental assessment tool improvement placed on the EGNOS User Support Webpage allowing CO2 reduction quantification.

In the maritime segment, support will be provided to the maritime and inland waterway authorities interested in the retransmission of EGNOS corrections via AIS stations or IALA beacons by offering a trade-off architecture analysis (supported with a CBA). Additionally, continuous analysis of the available SBAS compatible devices (navigation equipment, Portable Pilot Units -PPUs-, AIS, buoys, etc.) will be performed, together with promotion activities. This promotion is also associated with a better understanding of SBAS use and user requirements. Additionally, support in the development of SBAS guidelines for maritime receivers' manufacturers and strengthening relations with main stakeholders will continue.

In the rail sector, a market assessment of EGNSS enabled tracking devices supporting non-safety applications in freight and passenger trains is ongoing, with the subsequent promotion of the results. Support to relevant projects within the framework of signalling applications is foreseen, together with the follow up of the Change Request (CR1368) presented to ERA for the inclusion of EGNOS in the next update of the ERTMS regulatory framework.

In agriculture, contacts triggered in preceding years will be maintained to continue supporting users and demonstrating the EGNOS benefits. The geomatics market segment is no longer included in the EUSPA markets split; however, EUSPA wishes to take advantage of the work performed so far, and some activities will continue this year.

Support for transversal activities has been increased this year, focusing on EDAS usage, the development of device configuration guidelines in several market segments and the monitoring of the access to EGNOS awareness material.

This year, for the first time, support for new market segments is foreseen, especially within Energy and Raw materials, Smart Mobility and Urban Development. The objective is to assess the potential contribution of EGNOS to these markets and the identification of success stories.

Figure 46: The EGNOS Multimodal Adoption plan aims at fostering EGNOS use in all market segments

5.1.5 2022 EGNOS Workshop

The 2022 EGNOS Annual Workshop will be integrated into the EU Space Week, organised by the EUSPA in Prague (Czech Republic), from 3 to 6 October 2022.

Figure 47: EGNOS Workshop 2022 in the EU Space Week 2022

APPENDIX A FULL LIST OF EGNOS-BASED APPROACH PROCEDURES

The information shown in this annex corresponds to the situation at AIRAC Cycle#2203 (24/03/2022). For an up to date list of the published EGNOS based procedures, please refer to the EGNOS User Support Website.

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Akureyri	Iceland	BIAR	2	21/05/2020							2
Aerodrome	Grimsey	Iceland	BIGR	1	22/04/2021							1
Aerodrome	Husavik	Iceland	BIHU	1	29/03/2019							1
Aerodrome	Vopnafjordur	Iceland	BIVO	1	22/04/2021							1
Aerodrome	Cles Helipad	Italy	DT71	2	30/01/2020							2
Aerodrome	Antwerpen / Deurne	Belgium	EBAW	1	10/12/2015							1
Aerodrome	Brussels-National	Belgium	EBBR	4	06/12/2018							4
Aerodrome	Charleroi / Brussels South	Belgium	EBCI	2	31/03/2016							2
Aerodrome	Kortrijk/Wevelgem	Belgium	EBKT	1	09/11/2017							1
Aerodrome	Liège	Belgium	EBLG	2	13/10/2016							2
Aerodrome	Oostende-Brugge	Belgium	EBOS					2	03/01/2019			2
Aerodrome	Bautzen	Germany	EDAB	1	27/04/2017		15/12/2011					1
Aerodrome	Leipzig/Altenburg	Germany	EDAC					2	28/03/2019			2
Aerodrome	Strausberg	Germany	EDAY					2	17/06/2021			2
Aerodrome	Schoenhagen	Germany	EDAZ					1	11/10/2018			1
Aerodrome	Barth	Germany	EDBH				03/06/2010	1	09/09/2021			1
Aerodrome	Magdeburg/City	Germany	EDBM	1	13/12/2012							1
Aerodrome	Neubrandenburg	Germany	EDBN	2	02/04/2015							2
Aerodrome	Berlin Brandenburg	Germany	EDDB				04/06/2009	4	08/10/2020			4
Aerodrome	Dresden	Germany	EDDC			2	15/12/2011					2
Aerodrome	Erfurt-Weimar	Germany	EDDE				15/12/2011	2	09/09/2021			2

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Frankfurt Main	Germany	EDDF			4	15/12/2011					4
Aerodrome	Münster/Osnabrück	Germany	EDDG			2	15/12/2011					2
Aerodrome	Hamburg	Germany	EDDH				15/12/2011	4	18/06/2020			4
Aerodrome	Köln/Bonn	Germany	EDDK				15/12/2011	6	12/09/2019			6
Aerodrome	Düsseldorf	Germany	EDDL			4	15/12/2011					4
Aerodrome	München	Germany	EDDM				15/12/2011	4	23/05/2019			4
Aerodrome	Nürnberg	Germany	EDDN			1	15/12/2011					1
Aerodrome	Leipzig/Halle	Germany	EDDP				15/12/2011	4	30/01/2020			4
Aerodrome	Saarbrücken	Germany	EDDR		01/03/2018	2	28/03/2019					2
Aerodrome	Stuttgart	Germany	EDDS				15/12/2011		23/04/2020			0
Aerodrome	Berlin-Tegel	Germany	EDDT				15/12/2011					0
Aerodrome	Hannover	Germany	EDDV			4	15/12/2011					4
Aerodrome	Bremen	Germany	EDDW				15/12/2011	2	30/03/2017			2
Aerodrome	Frankfurt Hahn	Germany	EDFH		23/07/2015			2	14/09/2017			2
Aerodrome	Allendorf/Eder	Germany	EDFQ	1	21/08/2014							1
Aerodrome	Siegerland	Germany	EDGS	1	12/10/2017			1	12/10/2017			2
Aerodrome	Hamburg/Finkenwerder	Germany	EDHI		13/12/2012			2	18/06/2020			2
Aerodrome	Kiel-Holtenau	Germany	EDHK					2	18/06/2020			2
Aerodrome	Luebeck-Blankensee	Germany	EDHL					2	18/06/2020			2
Aerodrome	Memmingen	Germany	EDJA				15/12/2011	2	04/11/2021			2
Aerodrome	Moenchengladbach	Germany	EDLN					2	06/12/2018			2
Aerodrome	Paderborn/Lippstadt	Germany	EDLP		13/12/2012			2	10/10/2019			2
Aerodrome	Niederrhein	Germany	EDLV	1	23/06/2016							1
Aerodrome	Dortmund	Germany	EDLW	2	12/12/2013							2
Aerodrome	Augsburg	Germany	EDMA			1	15/12/2011	1	11/10/2018			2

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Eggenfelden	Germany	EDME	1	11/12/2014							1
Aerodrome	Oberpfaffenhofen	Germany	EDMO		13/12/2012			1	23/05/2019			1
Aerodrome	Straubing	Germany	EDMS	1	11/12/2014							1
Aerodrome	Friedrichshafen	Germany	EDNY				15/12/2011	2	19/07/2018			2
Aerodrome	Donauwörth	Germany	EDPR	2	08/12/2016							2
Aerodrome	Bamberg-Breitenau	Germany	EDQA					2	02/12/2021			2
Aerodrome	Coburg-Brandensteinsebene	Germany	EDQC	1	11/12/2014							1
Aerodrome	Bayreuth	Germany	EDQD			1	15/12/2011					1
Aerodrome	Giebelstadt	Germany	EDQG				14/02/2012	2	02/12/2021			2
Aerodrome	Hof-Plauen	Germany	EDQM					2	21/06/2018			2
Aerodrome	Hassfurt-Schweinfurt	Germany	EDQT					1	23/04/2020			1
Aerodrome	Karlsruhe/Baden-Baden	Germany	EDSB		17/09/2015			2	27/04/2017			2
Aerodrome	Donaueschingen-Villingen	Germany	EDTD	1	11/12/2014							1
Aerodrome	Lahr	Germany	EDTL	1	23/06/2016			1	27/04/2017			2
Aerodrome	Mengen-Hohentengen	Germany	EDTM	1	11/12/2014							1
Aerodrome	Schwäbisch-Hall	Germany	EDTY	2	13/12/2012							2
Aerodrome	Braunschweig-Wolfsburg	Germany	EDVE	2	18/10/2012							2
Aerodrome	Kassel-Calden	Germany	EDVK	2	04/04/2013							2
Aerodrome	Emden	Germany	EDWE	4	30/05/2013							4
Aerodrome	Wilhelmshaven JadeWeserAirport	Germany	EDWI			2	15/12/2011					2
Aerodrome	Sylt	Germany	EDXW	2	10/12/2015							2
Aerodrome	Kärdla	Estonia	EEKA	2	31/01/2019							2
Aerodrome	Kuressaare	Estonia	EEKE	2	02/03/2017							2
Aerodrome	Lennart Meri Tallinn	Estonia	EETN					4	06/12/2018			4
Aerodrome	Tartu	Estonia	EETU	1	18/07/2019			1	18/07/2019			2

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Enontekiö	Finland	EFET	2	03/12/2020		07/12/2017					2
Aerodrome	Halli	Finland	EFHA	2	03/12/2020							2
Aerodrome	Helsinki-Vantaa	Finland	EFHK	6	27/02/2020							6
Aerodrome	Ivalo	Finland	EFIV	2	03/12/2020		07/12/2017					2
Aerodrome	Joensuu	Finland	EFJO	2	12/12/2013							2
Aerodrome	Jyväskylä	Finland	EFJY	2	28/01/2021		07/12/2017					2
Aerodrome	Kemi-Tornio	Finland	EFKE	2	28/01/2021		07/12/2017					2
Aerodrome	Kajaani	Finland	EFKI	2	03/12/2020		07/12/2017					2
Aerodrome	Kokkola-Pietarsaari	Finland	EFKK	2	18/06/2020		07/12/2017					2
Aerodrome	Kuusamo	Finland	EFKS	2	10/09/2020		07/12/2017					2
Aerodrome	Kittilä	Finland	EFKT	2	22/04/2021		07/12/2017					2
Aerodrome	Kuopio	Finland	EFKU	2	16/07/2020		07/12/2017					2
Aerodrome	Lappeenranta	Finland	EFLP	2	10/09/2020		07/12/2017					2
Aerodrome	Mariehamn	Finland	EFMA	2	18/06/2020		08/12/2017					2
Aerodrome	Mikkeli	Finland	EFMI	2	27/01/2022							2
Aerodrome	Oulu	Finland	EFOU	2	23/04/2020		07/12/2017					2
Aerodrome	Pori	Finland	EFPO	2	03/12/2020		07/12/2017					2
Aerodrome	Rovaniemi	Finland	EFRO	2	23/04/2020		07/12/2017					2
Aerodrome	Savonlinna	Finland	EFSA	2	03/12/2020		07/12/2017					2
Aerodrome	Tampere-Pirkkala	Finland	EFTP	2	27/02/2020		07/12/2017					2
Aerodrome	Turku	Finland	EFTU	2	27/02/2020		07/12/2017					2
Aerodrome	Utti	Finland	EFUT	2	28/01/2021							2
Aerodrome	Vaasa	Finland	EFVA	2	18/06/2020		07/12/2017					2
Aerodrome	Campbeltown	United Kingdom	EGEC		23/06/2016							0
Aerodrome	Cardiff	United Kingdom	EGFF		13/10/2016							0

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Bristol	United Kingdom	EGGD		21/08/2014							0
Aerodrome	Lands End	United Kingdom	EGHC		27/04/2017							0
Aerodrome	Yeovil	United Kingdom	EGHG		09/06/2017							0
Aerodrome	Southampton	United Kingdom	EGHI		11/10/2018							0
Aerodrome	Alderney	Guernsey	EGJA	2	07/12/2011							2
Aerodrome	Guernsey	Guernsey	EGJB					2	10/10/2019			2
Aerodrome	Jersey	Jersey	EGJJ					2	23/05/2019			2
Aerodrome	Barrow/Walney Island	United Kingdom	EGNL		23/06/2016							0
Aerodrome	Kirkwall	United Kingdom	EGPA		21/07/2016							0
Aerodrome	Sumburgh	United Kingdom	EGPB		11/10/2018							0
Aerodrome	Wick	United Kingdom	EGPC		23/06/2016							0
Aerodrome	Islay	United Kingdom	EGPI		18/08/2016							0
Aerodrome	Prestwick	United Kingdom	EGPK		30/01/2020				16/07/2020			0
Aerodrome	Dundee	United Kingdom	EGPN		30/03/2017							0
Aerodrome	Barra	United Kingdom	EGPR		18/08/2016							0
Aerodrome	Tiree	United Kingdom	EGPU		04/02/2016							0
Aerodrome	Exeter	United Kingdom	EGTE		21/08/2014							0
Aerodrome	Amsterdam	Netherlands	EHAM	1	21/06/2018			4	05/12/2019			5
Aerodrome	Weert/Budel	Netherlands	EHBD					1	31/12/2020			1
Aerodrome	Eindhoven	Netherlands	EHEH					2	28/01/2021			2
Aerodrome	Eelde	Netherlands	EHGG	2	13/11/2014							2
Aerodrome	Den Helder - De Kooy	Netherlands	EHKD					3	28/01/2021			3
Aerodrome	Lelystad	Netherlands	EHLE	2	05/12/2019							2
Aerodrome	Leeuwarden	Netherlands	EHLW					2	28/01/2021			2
Aerodrome	Teuge	Netherlands	EHTE	1	13/11/2014							1

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Cork	Ireland	EICK	3	16/08/2018							3
Aerodrome	Dublin	Ireland	EIDW	4	25/05/2017							4
Aerodrome	Ireland West Airport	Ireland	EIKN	2	25/03/2021							2
Aerodrome	Sligo	Ireland	EISG	2	25/03/2021							2
Aerodrome	Aarhus	Denmark	EKAH	2	05/03/2015							2
Aerodrome	Billund	Denmark	EKBI					2	20/07/2017			2
Aerodrome	Esbjerg	Denmark	EKEB		15/10/2015			2	26/03/2020			2
Aerodrome	Karup	Denmark	EKKA	2	02/04/2015							2
Aerodrome	Sønderborg	Denmark	EKSB		18/08/2016			2	30/12/2021			2
Aerodrome	Sindal	Denmark	EKSN	1	18/06/2020			1	18/06/2020			2
Aerodrome	Luxembourg	Luxembourg	ELLX					2	26/03/2020			2
Aerodrome	Ålesund/Vigra	Norway	ENAL		03/03/2016			2	07/11/2019			2
Aerodrome	Andøya/Andenes	Norway	ENAN	2	02/04/2015							2
Aerodrome	Arendal hospital	Norway	ENAR	1	20/05/2021							1
Aerodrome	Bergen Gronneviksoren	Norway	ENBG	1	20/05/2021							1
Aerodrome	Førde/Bringeland	Norway	ENBL	1	28/05/2015			1	27/04/2017			2
Aerodrome	Brønnøysund/Brønnøy	Norway	ENBN	1	08/12/2016							1
Aerodrome	Bodo	Norway	ENBO	1	06/12/2018							1
Aerodrome	Bergen/Flesland	Norway	ENBR				03/03/2016	2	28/02/2019			2
Aerodrome	Båtsfjord	Norway	ENBS	2	02/12/2021							2
Aerodrome	Berlevåg	Norway	ENBV	2	02/12/2021							2
Aerodrome	Kristiansand/Kjevik	Norway	ENCN			2	03/03/2016					2
Aerodrome	Bardufoss	Norway	ENDU	2	26/04/2018							2
Aerodrome	Harstad/Narvik/Evenes	Norway	ENEV	1	30/03/2017			1	30/06/2021			2
Aerodrome	Florø	Norway	ENFL	1	02/04/2015							1

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Gardermoen	Norway	ENGM					4	10/11/2016			4
Aerodrome	Haugesund/Karmøy	Norway	ENHD				03/03/2016	2	13/08/2020			2
Aerodrome	Hasvik	Norway	ENHK					2	03/12/2020			2
Aerodrome	Hattfjelldal	Norway	ENHT	1	20/05/2021							1
Aerodrome	Haugesund Hospital	Norway	ENHX	1	17/06/2021							1
Aerodrome	Kristiansund/Kvernberget	Norway	ENKB		26/05/2016			2	31/12/2020			2
Aerodrome	Kongsvinger Hospital	Norway	ENKG	1	17/06/2021							1
Aerodrome	Kirkenes/Hoybuktmoen	Norway	ENKR	2	27/04/2017							2
Aerodrome	Lillehammer Hospìtal	Norway	ENLH	2	17/06/2021							2
Aerodrome	Leknes	Norway	ENLK	1	02/02/2017	1	10/10/2019					2
Aerodrome	Mehamn	Norway	ENMH	2	05/12/2019		28/03/2019					2
Aerodrome	Molde/Årø	Norway	ENML					2	30/03/2017			2
Aerodrome	Mosjøen/Kjærstad	Norway	ENMS	1	30/03/2017							1
Aerodrome	Namsos Hospital	Norway	ENNH	1	17/06/2021							1
Aerodrome	Namsos	Norway	ENNM		02/04/2015			2	27/04/2017			2
Aerodrome	Ørland	Norway	ENOL				03/03/2016	2	12/10/2017			2
Aerodrome	Rørvik/Ryum	Norway	ENRM					2	02/02/2017			2
Aerodrome	Røst	Norway	ENRS	2	06/03/2014							2
Aerodrome	Moss/Rygge	Norway	ENRY	2	10/12/2015							2
Aerodrome	Sogndal/Haukasen	Norway	ENSG		17/08/2017			1	14/09/2017			1
Aerodrome	Svolvær/Helle	Norway	ENSH	1	08/12/2016							1
Aerodrome	Stokmarknes/Skagen	Norway	ENSK	1	08/12/2016							1
Aerodrome	Stord/Sørstokken	Norway	ENSO			2	03/03/2016					2
Aerodrome	Kalnes Hospital	Norway	ENSP	1	17/06/2021							1
Aerodrome	Sorkjosen	Norway	ENSR	1	20/05/2021							1

Operational Aerodromes / Heliports /Routes												
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Aerodrome	Vardø/Svartnes	Norway	ENSS	2	03/12/2020							2
Aerodrome	Sandnessjøen/Stokka	Norway	ENST		23/07/2015			2	30/01/2020			2
Aerodrome	Sandefjord/Torp	Norway	ENTO	2	20/08/2015							2
Aerodrome	Tromsø Univeristy Hospital	Norway	ENTU	1	17/06/2021							1
Aerodrome	Oslo Helikopterplass Taraldrud	Norway	ENTX		25/03/2021			2	30/06/2021			2
Aerodrome	Ullevål University Hospital	Norway	ENUH	2	20/05/2021							2
Aerodrome	Trondheim/Vårnes	Norway	ENVA				03/03/2016	2	27/02/2020			2
Aerodrome	Levanger Hospital	Norway	ENYY	1	17/06/2021							1
Aerodrome	Stavanger/Sola	Norway	ENZV				03/03/2016	4	09/11/2017			4
Aerodrome	Bydgoszcz - Szwederowo	Poland	EPBY					2	26/04/2018			2
Aerodrome	Gdańsk Lech Wałęsa	Poland	EPGD		28/05/2015			2	26/04/2018			2
Aerodrome	Kraków - Balice	Poland	EPKK		18/08/2016			2	26/04/2018			2
Aerodrome	Katowice	Poland	EPKT		03/04/2014			2	26/04/2018			2
Aerodrome	Lublin	Poland	EPLB					2	26/04/2018			2
Aerodrome	Łódź - Lublinek	Poland	EPLL					2	21/06/2018			2
Aerodrome	Warszawa/Modlin	Poland	EPMO					2	26/04/2018			2
Aerodrome	Poznan Lawica	Poland	EPPO					2	18/07/2019			2
Aerodrome	Rzeszów - Jasionka	Poland	EPRZ		15/09/2016			2	26/04/2018			2
Aerodrome	Szczecin - Goleniów	Poland	EPSC					2	26/04/2018			2
Aerodrome	Olsztyn - Mazury	Poland	EPSY					2	26/04/2018			2
Aerodrome	Warszawa - F. Chopin	Poland	EPWA					4	26/04/2018			4
Aerodrome	Wroclaw/Strachowice	Poland	EPWR		13/10/2016			2	26/04/2018			2
Aerodrome	Zielona Góra - Babimost	Poland	EPZG					2	18/07/2019			2
Aerodrome	Uppsala	Sweden	ESCM	4	21/05/2020							4
Aerodrome	Jönköping	Sweden	ESGJ	2	09/11/2017							2

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Aerodrome	Säve	Sweden	ESGP		05/11/2020			2	04/11/2021			2
Aerodrome	Skövde	Sweden	ESGR	2	31/05/2018							2
Aerodrome	Trollhättan-Vänersborgs flygplats	Sweden	ESGT	2	29/03/2018							2
Aerodrome	Mora/Siljan	Sweden	ESKM	2	30/01/2020							2
Aerodrome	Kristianstad	Sweden	ESMK	2	06/12/2018							2
Aerodrome	Kalmar Öland	Sweden	ESMQ	1	28/03/2019	1	28/03/2019					2
Aerodrome	Halmstad	Sweden	ESMT	2	08/11/2018							2
Aerodrome	Växjö Kronoberg	Sweden	ESMX	2	25/04/2019							2
Aerodrome	Sveg	Sweden	ESND	2	31/01/2019							2
Aerodrome	Lapland	Sweden	ESNG	2	20/06/2019							2
Aerodrome	Kramfors-Sollefteå	Sweden	ESNK	2	13/08/2020							2
Aerodrome	Lycksele	Sweden	ESNL	2	15/08/2019							2
Aerodrome	Örnsköldsvik	Sweden	ESNO	2	07/12/2017							2
Aerodrome	Skellefteå	Sweden	ESNS	2	21/05/2020		28/03/2019					2
Aerodrome	Vilhelmina	Sweden	ESNV	2	27/02/2020							2
Aerodrome	Arvidsjaur	Sweden	ESNX	2	05/12/2019							2
Aerodrome	Örebro	Sweden	ESOE	2	16/08/2018							2
Aerodrome	Hagfors	Sweden	ESOH	2	30/01/2020							2
Aerodrome	Karlstad Airport	Sweden	ESOK	2	05/11/2020							2
Aerodrome	Stockholm/Västerås	Sweden	ESOW	2	30/01/2020							2
Aerodrome	Borlänge Dala	Sweden	ESSD	2	05/11/2020							2
Aerodrome	Linköping/Saab	Sweden	ESSL	2	31/01/2019							2
Aerodrome	Norrköping Kungsängen	Sweden	ESSP	2	29/03/2018							2
Aerodrome	Torsby	Sweden	ESST	2	23/05/2019							2
Aerodrome	Eskilstuna	Sweden	ESSU	2	10/09/2020							2

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Aerodrome	Visby	Sweden	ESSV	1	17/06/2021			1	25/03/2021			2
Aerodrome	Ängelholm	Sweden	ESTA	2	24/03/2022							2
Aerodrome	Ljungbyhed	Sweden	ESTL	2	17/06/2021							2
Aerodrome	Storuman	Sweden	ESUD		11/12/2014							0
Aerodrome	Pajala	Sweden	ESUP	2	31/12/2020							2
Aerodrome	Hemavan Tärnaby Airport AB	Sweden	ESUT	1	11/10/2018							1
Aerodrome	Lielvarde	Latvia	EVGA					2	27/01/2022			2
Aerodrome	Riga	Latvia	EVRA					2	27/01/2022			2
Aerodrome	Kaunas	Lithuania	EYKA	2	09/09/2021							2
Aerodrome	Palanga	Lithuania	EYPA	1	25/03/2021							1
Aerodrome	Vilnius	Lithuania	EYVI	2	16/07/2020							2
Aerodrome	Lanzarote AD	Spain	GCRR	1	23/05/2019							1
Aerodrome	Burgas	Bulgaria	LBBG	2	04/11/2021							2
Aerodrome	Gorna Oryahovitsa	Bulgaria	LBGO	2	04/11/2021							2
Aerodrome	Plovdiv	Bulgaria	LBPD	3	04/11/2021							3
Aerodrome	Dubrovnik	Croatia	LDDU	1	10/12/2015							1
Aerodrome	Osijek/Klisa	Croatia	LDOS	1	29/03/2018							1
Aerodrome	Pula	Croatia	LDPL	2	26/04/2018							2
Aerodrome	Rijeka	Croatia	LDRI	2	12/09/2019							2
Aerodrome	Brač	Croatia	LDSB	2	05/12/2019							2
Aerodrome	Split/Kastela	Croatia	LDSP	1	29/03/2018							1
Aerodrome	Zagreb/Pleso	Croatia	LDZA	2	29/03/2018							2
Aerodrome	Zadar	Croatia	LDZD	4	11/10/2018							4
Aerodrome	Almería	Spain	LEAM	2	02/02/2017							2
Aerodrome	Josep Tarradellas Barcelona-El Prat	Spain	LEBL					5	04/11/2021			5

Operational Aerodromes / Heliports /Routes												
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Aerodrome	Girona	Spain	LEGE	1	24/03/2022							1
Aerodrome	Jerez	Spain	LEJR	1	02/12/2021							1
Aerodrome	Palma de Mallorca	Spain	LEPA	3	01/03/2018							3
Aerodrome	Valencia Airport	Spain	LEVC	2	01/02/2018							2
Aerodrome	Vigo	Spain	LEVX	2	05/12/2019							2
Aerodrome	Santander	Spain	LEXJ	2	17/10/2013							2
Aerodrome	Dieppe Saint Aubin	France	LFAB	1	02/03/2017							1
Aerodrome	Calais	France	LFAC	1	20/09/2012							1
Aerodrome	Albert Bray	France	LFAQ	1	15/11/2012			1	21/11/2017			2
Aerodrome	Le Touquet Paris Plage	France	LFAT	1	04/02/2016			1	21/11/2017			2
Aerodrome	Valenciennes Denain	France	LFAV	1	19/09/2013			1	21/11/2017			2
Aerodrome	Amiens Glisy	France	LFAY	1	27/06/2013							1
Aerodrome	Agen La Garenne	France	LFBA		06/03/2014			1	21/11/2017			1
Aerodrome	Bordeaux Merignac	France	LFBD		08/03/2012			4	21/11/2017			4
Aerodrome	Bergerac	France	LFBE		09/01/2014			2	21/11/2017			2
Aerodrome	Toulouse Francazal	France	LFBF	2	23/06/2016							2
Aerodrome	La Rochelle	France	LFBH		20/09/2012			2	04/11/2021			2
Aerodrome	Poitiers Biard	France	LFBI	1	12/11/2015			1	21/11/2017			2
Aerodrome	Montluçon Gueret	France	LFBK	1	17/12/2013							1
Aerodrome	Limoges	France	LFBL		28/06/2012			2	21/11/2017			2
Aerodrome	Niort Marais Poitevin	France	LFBN	1	02/03/2017							1
Aerodrome	Toulouse Blagnac	France	LFBO	4	03/05/2012							4
Aerodrome	Pau-Pyrénées	France	LFBP	1	17/03/2011							1
Aerodrome	Muret Lherm	France	LFBR	1	15/10/2015							1
Aerodrome	Biscarrosse Parentis	France	LFBS					1	04/11/2021			1

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Aerodrome	Tarbes Lourdes Pyrénées	France	LFBT	1	28/05/2015							1
Aerodrome	Angoulême Brie Champniers	France	LFBU		03/04/2014			2	21/11/2017			2
Aerodrome	Périgueux Bassillac	France	LFBX		28/05/2015			1	25/05/2017			1
Aerodrome	Biarritz Bayonne Anglet	France	LFBZ		09/02/2012		01/01/2013	2	26/04/2018			2
Aerodrome	Albi Le Sequestre	France	LFCI	1	26/05/2016			1	21/11/2017			2
Aerodrome	Castres Mazamet	France	LFCK	1	22/08/2013							1
Aerodrome	Rodez Marcillac	France	LFCR	1	31/05/2012			1	21/11/2017			2
Aerodrome	Royan Médis	France	LFCY	1	30/04/2015							1
Aerodrome	Auch Lamothe	France	LFDH	2	28/05/2015							2
Aerodrome	Rochefort Charente Maritime	France	LFDN					1	23/05/2018			1
Aerodrome	Ouessant	France	LFEC	2	11/12/2014							2
Aerodrome	Ile d Yeu	France	LFEY					2	04/11/2021			2
Aerodrome	Colmar Houssen	France	LFGA		02/05/2013			2	21/06/2018			2
Aerodrome	Dole Tavaux	France	LFGJ		09/01/2014			1	21/11/2017			1
Aerodrome	Le Puy Loudes	France	LFHP		04/02/2016			2	28/02/2019			2
Aerodrome	Moulins Montbeugny	France	LFHY	1	01/05/2014							1
Aerodrome	Metz Nancy Lorraine	France	LFJL	1	04/04/2013			1	21/11/2017			2
Aerodrome	Angers Marcé	France	LFJR		07/01/2016			1	21/11/2017			1
Aerodrome	Bastia Poretta	France	LFKB					1	07/12/2017			1
Aerodrome	Calvi Sainte Catherine	France	LFKC		30/04/2015			2	04/11/2021			2
Aerodrome	Figari Sud Corse	France	LFKF					1	21/11/2017			1
Aerodrome	Ajaccio Napoléon Bonaparte	France	LFKJ	1	23/06/2016							1
Aerodrome	Auxerre Branches	France	LFLA	2	21/08/2014							2
Aerodrome	Clermont-Ferrand Auvergne	France	LFLC		05/05/2011			1	21/11/2017			1
Aerodrome	Bourges	France	LFLD	1	18/08/2016							1

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Aerodrome	Lyon St Exupery	France	LFLL		07/02/2013			4	15/08/2019			4
Aerodrome	Saint Yan	France	LFLN					2	02/03/2017			2
Aerodrome	Annecy Meythet	France	LFLP		19/09/2013			2	04/11/2021			2
Aerodrome	Grenoble Isere	France	LFLS		05/12/2019			2	13/10/2016			2
Aerodrome	Valence	France	LFLU		13/12/2012			1	21/11/2017			1
Aerodrome	Vichy Charmeil	France	LFLV		05/02/2015			1	26/04/2018			1
Aerodrome	Aurillac	France	LFLW		26/06/2014			1	15/08/2019			1
Aerodrome	Chateauroux Deols	France	LFLX		06/02/2014			2	15/08/2019			2
Aerodrome	Lyon Bron	France	LFLY					2	28/09/2016			2
Aerodrome	Cannes Mandelieu	France	LFMD	1	05/02/2015							1
Aerodrome	Saint Étienne Bouthéon	France	LFMH		24/07/2014			2	02/02/2017			2
Aerodrome	Carcassonne Salvaza	France	LFMK		03/05/2012			2	21/11/2017			2
Aerodrome	Marseille	France	LFML	4	08/01/2015	2	25/06/2015					6
Aerodrome	Nice Côte d'Azur	France	LFMN		25/06/2015			2	25/04/2019			2
Aerodrome	Perpignan Rivesaltes	France	LFMP	1	15/10/2015							1
Aerodrome	Montpellier Mediterranee	France	LFMT					1	05/12/2019			1
Aerodrome	Béziers Vias	France	LFMU	2	18/10/2012							2
Aerodrome	Avignon Caumont	France	LFMV					3	21/06/2018			3
Aerodrome	Mende	France	LFNB	1	17/12/2013							1
Aerodrome	Beauvais	France	LFOB	1	20/09/2012							1
Aerodrome	Le Havre Octeville	France	LFOH		10/12/2015			2	21/11/2017			2
Aerodrome	Chalons Vatry	France	LFOK	2	02/02/2017							2
Aerodrome	Blois Le Breuil	France	LFOQ		15/09/2016			1	25/04/2019			1
Aerodrome	Cholet le Pontreau	France	LFOU	2	04/02/2016							2
Aerodrome	Laval Entrammes	France	LFOV	2	26/04/2018							2

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Aerodrome	Orléans Saint Denis De L'Hotel	France	LFOZ		28/06/2012			2	04/11/2021			2
Aerodrome	Paris-Le Bourget	France	LFPB	1	02/06/2011			1	21/11/2017			2
Aerodrome	Paris Charles de Gaulle	France	LFPG					8	28/04/2016			8
Aerodrome	Melun Villaroche	France	LFPM		10/12/2015			2	21/11/2017			2
Aerodrome	Toussus Le Noble	France	LFPN					2	27/04/2017			2
Aerodrome	Paris Orly	France	LFPO	2	30/05/2013	1	30/04/2015	2	21/11/2017			5
Aerodrome	Pontoise Cormeilles en Vexin	France	LFPT	1	01/05/2014			2	21/11/2017			3
Aerodrome	Reims Prunay	France	LFQA	1	03/04/2014							1
Aerodrome	Troyes Barberey	France	LFQB					2	18/08/2016			2
Aerodrome	Nevers Fouchambault	France	LFQG	1	13/12/2012							1
Aerodrome	Besançon La Vèze	France	LFQM	1	18/09/2014							1
Aerodrome	Lille Lesquin	France	LFQQ	3	26/06/2014							3
Aerodrome	Merville	France	LFQT	2	15/11/2012							2
Aerodrome	Brest Bretagne	France	LFRB		03/05/2012	1	01/01/2014	1	04/11/2021			2
Aerodrome	Cherbourg Maupertus	France	LFRC					1	23/06/2016			1
Aerodrome	Dinard	France	LFRD	1	06/02/2014			1	21/11/2017			2
Aerodrome	Deauville Normancie	France	LFRG	1	18/09/2014			1	04/11/2021			2
Aerodrome	La Roche Sur Yon Les Ajoncs	France	LFRI		13/12/2012			2	10/11/2016			2
Aerodrome	Caen Carpiquet	France	LFRK		11/12/2014			1	21/11/2017			1
Aerodrome	Le Mans	France	LFRM	1	15/11/2012							1
Aerodrome	Rennes	France	LFRN	2	30/05/2013							2
Aerodrome	Lannion	France	LFRO		07/01/2016			1	21/11/2017			1
Aerodrome	Quimper	France	LFRQ		29/03/2019			2	21/11/2017			2
Aerodrome	Nantes	France	LFRS	1	28/06/2012							1
Aerodrome	Saint Brieuc Armor	France	LFRT		10/12/2015			1	21/11/2017			1

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Aerodrome	Morlaix Ploujean	France	LFRU	1	13/10/2016							1
Aerodrome	Vannes Meucon	France	LFRV	1	31/05/2012							1
Aerodrome	Saint Nazaire Montoir	France	LFRZ		28/10/2014			1	21/11/2017			1
Aerodrome	Bâle-Mulhouse	France	LFSB	2	10/12/2015							2
Aerodrome	Dijon-Longvic	France	LFSD	1	28/04/2016							1
Aerodrome	Epinal Mirecourt	France	LFSG	1	30/05/2013							1
Aerodrome	Brive Souillac	France	LFSL		22/08/2013			2	04/11/2021			2
Aerodrome	Nancy Essey	France	LFSN		02/05/2013			1	26/04/2018			1
Aerodrome	Strasbourg Entzheim	France	LFST		10/12/2015			2	21/11/2017			2
Aerodrome	Nîmes Garons	France	LFTW	1	18/10/2012			1	21/11/2017			2
Aerodrome	Ioannina	Greece	LGIO	2	27/02/2020							2
Aerodrome	Kos	Greece	LGKO	2	27/02/2020							2
Aerodrome	Mitilini	Greece	LGMT	1	27/02/2020							1
Aerodrome	Thessaloniki	Greece	LGTS	1	27/02/2020							1
Aerodrome	Békéscsaba Repülőtér	Hungary	LHBC	2	28/01/2021							2
Aerodrome	Budapest Liszt Ferenc	Hungary	LHBP					4	15/09/2016			4
Aerodrome	Debrecen International	Hungary	LHDC	1	30/01/2020							1
Aerodrome	Nyíregyháza Airport	Hungary	LHNY	4	24/03/2022							4
Aerodrome	Pecs-Pogany	Hungary	LHPP	1	03/12/2020			1	03/12/2020			2
Aerodrome	Győr-Pér	Hungary	LHPR	1	25/02/2021			1	25/02/2021			2
Aerodrome	Heviz-Balaton	Hungary	LHSM	1	25/03/2021			1	25/03/2021			2
Aerodrome	Bari/Palese	Italy	LIBD					2	25/03/2021			2
Aerodrome	Taranti/Grottaglie	Italy	LIBG					1	20/05/2021			1
Aerodrome	Brindisi/Casale	Italy	LIBR					2	07/10/2021			2
Aerodrome	Lampedusa	Italy	LICD					2	30/01/2020			2

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Aerodrome	Pantelleria	Italy	LICG					3	21/06/2018			3
Aerodrome	Palermo/Punta Raisi	Italy	LICJ	3	11/10/2018							3
Aerodrome	Reggio Calabria	Italy	LICR					1	19/07/2018			1
Aerodrome	Trento/Mattarello	Italy	LIDT	2	30/01/2020							2
Aerodrome	Alghero/Fertilia	Italy	LIEA	2	11/10/2018							2
Aerodrome	Milano/Malpensa	Italy	LIMC	2	21/08/2014			4	23/04/2020			6
Aerodrome	Bergamo /Orio al Serio	Italy	LIME	1	20/07/2017			1	08/10/2020			2
Aerodrome	Torino/Caselle	Italy	LIMF					1	25/03/2021			1
Aerodrome	Genova/Sestri	Italy	LIMJ					1	10/09/2020			1
Aerodrome	Milano/Linate	Italy	LIML	2	13/12/2012							2
Aerodrome	Parma	Italy	LIMP					1	23/05/2018			1
Aerodrome	Cuneo/Levaldigi	Italy	LIMZ					1	23/05/2018			1
Aerodrome	Bologna/Borgo Panigale	Italy	LIPE	2	03/01/2019							2
Aerodrome	Trieste/Ronchi dei Legionari	Italy	LIPQ					1	12/08/2021			1
Aerodrome	Rimini/Miramare	Italy	LIPR					2	15/07/2021			2
Aerodrome	Verona/Villafranca	Italy	LIPX		22/06/2017							0
Aerodrome	Ancona/Falconara	Italy	LIPY					1	03/01/2019			1
Aerodrome	Venezia/Tessera	Italy	LIPZ	4	27/06/2013							4
Aerodrome	Roma/Ciampino	Italy	LIRA					2	21/05/2020			2
Aerodrome	Roma/Fiumicino	Italy	LIRF	4	10/01/2013			2	23/05/2019			6
Aerodrome	Napoli/Capodichino	Italy	LIRN					1	07/10/2021			1
Aerodrome	Firenze/Peretola	Italy	LIRQ	1	22/06/2017							1
Aerodrome	Kunovice	Czech Republic	LKKU	1	01/12/2017							1
Aerodrome	Karlovy Vary	Czech Republic	LKKV	2	13/11/2014							2
Aerodrome	Ostrava	Czech Republic	LKMT	2	09/01/2014							2

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Prague	Czech Republic	LKPR				09/01/2014	4	05/12/2019			4
Aerodrome	Brno	Czech Republic	LKTB	2	09/01/2014							2
Aerodrome	Praha/Vodochody	Czech republic	LKVO	2	25/06/2015							2
Aerodrome	Luqa	Malta	LMML	2	11/10/2018			2	11/10/2018			4
Aerodrome	Vöslau	Austria	LOAV	1	28/02/2019							1
Aerodrome	Öamtc/Oberwart	Austria	LODO	1	28/02/2019							1
Aerodrome	Graz	Austria	LOWG		09/01/2014			2	01/03/2018			2
Aerodrome	Innsbruck	Austria	LOWI					1	01/02/2018			1
Aerodrome	Klagenfurt	Austria	LOWK					2	11/10/2018			2
Aerodrome	Linz	Austria	LOWL		09/01/2014			2	02/02/2017			2
Aerodrome	Salzburg	Austria	LOWS					1	23/04/2020			1
Aerodrome	Wien - Schwechat	Austria	LOWW					5	02/02/2017			5
Aerodrome	Cascais	Portugal	LPCS	1	20/05/2021							1
Aerodrome	Faro	Portugal	LPFR	1	18/07/2019							1
Aerodrome	Porto	Portugal	LPPR	1	12/10/2017							1
Aerodrome	Lisboa	Portugal	LPPT	2	28/05/2015							2
Aerodrome	Cluj - Napoca / Avram Iancu	Romania	LRCL	2	10/11/2016							2
Aerodrome	Les Eplatures	Switzerland	LSGC					2	26/05/2016			2
Aerodrome	Genève	Switzerland	LSGG		12/11/2015			2	13/09/2018			2
Aerodrome	Dübendorf	Switzerland	LSMD	2	21/08/2014			1	30/01/2020			3
Aerodrome	Emmen	Switzerland	LSME	1	03/04/2014							1
Aerodrome	Payerne	Switzerland	LSMP		17/09/2015			1	05/12/2019			1
Aerodrome	Bern-Belp	Switzerland	LSZB		07/03/2013			1	03/12/2020			1
Aerodrome	Grenchen	Switzerland	LSZG	1	25/07/2013							1
Aerodrome	Zurich	Switzerland	LSZH		06/12/2018			2	25/05/2017			2

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	St. Gallen-Altenrhein	Switzerland	LSZR	1	17/11/2011							1
Aerodrome	Beograd/Nikola Tesla	Serbia	LYBE					2	26/03/2020			2
Aerodrome	KRALJEVO/Morava	Serbia	LYKV					2	24/02/2022			2
Aerodrome	Niš/Konstantin Veliki	Serbia	LYNI					1	26/03/2020			1
Aerodrome	Podgorica	Montenegro	LYPG					1	26/03/2020			1
Aerodrome	Bratislava-Milan Rastislav Štefánik	Slovak Republic	LZIB	2	05/02/2015							2
Aerodrome	Košice	Slovak Republic	LZKZ	2	05/02/2015							2
Aerodrome	Piešťany	Slovak Republic	LZPP					1	02/02/2017			1
Aerodrome	Poprad-Tatry	Slovak Republic	LZTT					2	29/03/2018			2
Aerodrome	Žilina	Slovak Republic	LZZI					1	25/05/2017			1
Aerodrome	Bjarkoy	Norway	XZBK	1	20/05/2021							1
Aerodrome	Evenskjaer	Norway	XZES	1	20/05/2021							1
Aerodrome	Finnsnes	Norway	XZFI	1	20/05/2021							1
Aerodrome	Hamar Hospital	Norway	XZHM	1	17/06/2021							1
Aerodrome	Innhavet	Norway	XZIH	1	17/06/2021							1
Aerodrome	Kautokeino	Norway	XZKA	1	20/05/2021							1
Aerodrome	Kongsberg Hospital	Norway	XZKB	1	17/06/2021							1
Aerodrome	Karasjok	Norway	XZKS	1	20/05/2021							1
Aerodrome	Lofoten Hospital	Norway	XZLK	1	17/06/2021							1
Aerodrome	Mosjøen	Norway	XZMK	1	17/06/2021							1
Aerodrome	Mysen	Norway	XZMY	1	17/06/2021							1
Aerodrome	Narvik	Norway	XZNK	1	17/06/2021							1
Aerodrome	Skjervøy	Norway	XZSC	1	17/06/2021							1
Aerodrome	Storsteinnes	Norway	XZSO	1	20/05/2021							1
Aerodrome	Sandnessjøen Hospital	Norway	XZSS	1	17/06/2021							1

Operational Aerodromes / Heliports /Routes												
Type	Name	Country	ICAO Code	APV-I Procedure	Activation APV-I procedure	APV Baro Procedure	Activation APV Baro Procedure	LPV-200 Procedure	Activation LPV-200 procedure	RNP 0.3 Procedure	Activation RNP 0.3 procedure	Total Procedures
Aerodrome	Trones	Norway	XZTN	1	17/06/2021							1
Route	Hel Low-Flight Route KY251	Switzerland	KY251							1	22/06/2017	1
Route	Hel Low-Flight Route KY252	Switzerland	KY252							1	22/06/2017	1
Route	Hel Low-Flight Route KY253	Switzerland	KY253							1	22/06/2017	1
Route	Hel Low-Flight Route KY256	Switzerland	KY256							1	22/06/2017	1
Route	Hel Low-Flight Route KY257	Switzerland	KY257							1	22/06/2017	1

Table 14: Full list of EGNOS-based Approach Procedures as of March 2022 (AIRAC cycle#2203)

APPENDIX B LIST OF ACRONYMS

Acronym	Definition
AIRAC	Aeronautical Information Regulation And Control
AIS	Automatic Identification System
AME	Accuracy Major Event
ANSP	Air Navigation Service Provider
APV	Approach Procedures with Vertical guidance
ASECNA	Agency for Aerial Navigation Safety in Africa and Madagascar
ATM	Air Traffic Management
CBA	Cost Benefit Analysis
CEO	Chief Executive Officer
COVID	COronaVIrus Disease
CPF	Central Processing Facility
DGNSS	Differential Global Navigation Satellite System
DH	Decision Height
EASA	European Aviation Safety Agency
EC	European Commission
EDAS	EGNOS Data Access Service
EGNOS	European Geostationary Navigation Overlay Service
EGNSS	European Global Navigation Satellite System
EMA	EGNOS Multimodal Adoption
ERA	European Regions Airline Association
ERTMS	European Rail Traffic Management System
ESR	EGNOS System Release
ESSP	European Satellite Services Provider
EU	European Union
EUSPA	European Union Agency for the Space Programme
EUSW	EGNOS User Support Website
EWA	EGNOS Working Agreement
EWAN	EGNOS Wide Area Network
FTP	File Transfer Protocol
GEO	GEOstationary
GNSS	Global Navigation Satellite System
GPS	GPS Precision Positioning Service
HAL	Horizontal Alarm Limit
HEMS	Helicopter Emergency Medical Services
HNSE	Horizontal Navigation System Error
HPL	Horizontal Protection Level
HSI	Horizontal Safety Index
IALA	International Association of Lighthouse Authorities
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
KARI	Korea Aerospace Research Institute
LPV	Localizer performance with vertical guidance

MOPS	Minimum Operational Performance Standards
NPA	Non Precision Approach
OEM	Original Equipment Manufacturer
OP	Operational
OS	Open Service
PBN	Performance-Based Navigation
PRN	Pseudo Random Noise
RIMS	Ranging and Integrity Monitoring Station
RNP	Required Navigation Performance
RTCA	Radio Technical Commission for Aeronautics
SARPS	Standards and Recommended Practices
SBAS	Satellite Based Augmentation System
SDD	Service Definition Document
SES	Single European Sky
SIR	Services Implementation Roadmaps
SIS	Signal In Space
SN	Service Notice
VAL	Vertical Alert Limit
VNSE	Vertical Navigation System Error
VPL	Vertical Protection Level
VSI	Vertical Safety Index
YSR	Yearly System Release

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